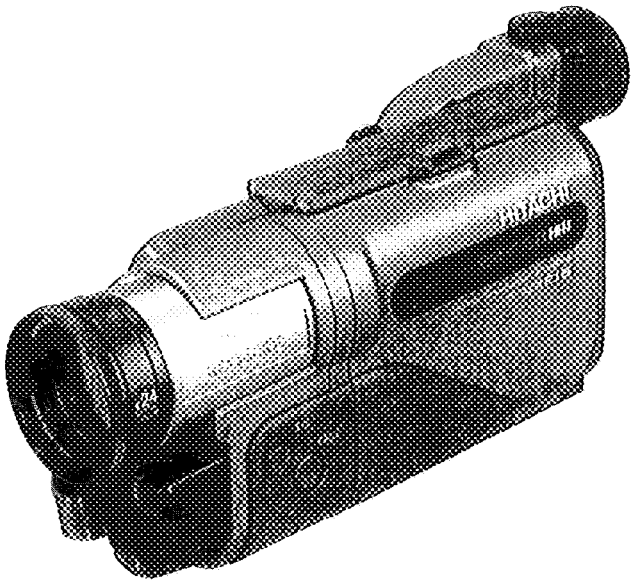
HITACHI

V01609

8mm VIDEO CAMERA/RECORDER

VM-H70E/VM-H71E



VM-H70E

VM-H71E

Instruction manual

To obtain the best performance and ensure years of trouble-free use, please read this instruction manual completely.

Hi 8

PRECAUTION

■ **No water, dust or sand**
Be careful that no water, dust or sand enters the camera/recorder because it may cause trouble and accidents.

■ Do not leave the viewfinder lens facing sunlight for a prolonged period, or the phosphorescent surface of the cathode ray tube or the liquid crystal display (LCD) panel may be damaged.

■ When you shoot at a scene which contains an extremely bright object such as the sun or a light source, a bright vertical bar may appear in the picture.
Your camera/recorder is functioning properly, but the solid-state pickup device (C.C.D) usually causes this as an inherent characteristic. Try to avoid shooting an excessive bright object directly.

■ The liquid crystal display (LCD) panel is made by highly precise technology. More than 99.99% of its picture elements (pixels) are effective, but some (less than 0.01%) may appear as coloured bright dots. This does not indicate a fault as the LCD panel stretches the limits of current technology. (only for VM-H71E)

MOISTURE
Avoid operating your camera/recorder immediately after moving it from a cold place to a warm, humid place. Give the camera/recorder 2 to 3 hours to stabilize in the ambient conditions of the surroundings before inserting a cassette. When moved from a cold place to a warm, humid place, moisture may condense on the head drum inside the machine. This moisture could cause the tape to stick to the headwheel and damage the headwheel or tape.
When moisture is detected, the camera/recorder ejects the tape automatically to protect it, so the camera/recorder cannot be operated. When a small amount of moisture is sensed, "TAPE" flashes in the viewfinder and the camera/recorder cannot accept any operations other than eject. Remove the cassette and set the OPERATE switch to OFF, then wait for about one hour.

BE SURE NOT TO LEAVE IT IN A PLACE AT HIGH TEMPERATURE EXCEEDING 50°C, OR ITS INTERNAL PARTS MAY DETERIORATE. BE CAREFUL NOT TO LEAVE THE UNIT IN THE FOLLOWING PLACES:
* **Inside a car with the window closed and in direct sunshine.**
* **Near heating appliances.**
* **In direct sunshine in summer.**

NOTES:
- This unit uses **Hi8** video format cassettes. (See page 15)
- It records and plays back in the SP mode (20.05 mm/sec.).
- This camera/recorder uses a Hi-Fi stereo sound system. When a tape recorded by this camera/recorder is played by a conventional 8mm camera/recorder, monaural sound is output. When a tape recorded by a conventional 8mm camera/recorder is played by this machine, monaural sound is output.

This product is manufactured to comply with the radio interference requirements of EEC Directive 76/889/EEC, 82/499/EEC and 87/308/EEC.

WARNING : It is permissible to record television programmes only in the event that third party copyrights and other rights are not violated.

- **Difference between Models VM-H70E/H71E**

	VM-H70E	VM-H71E
Viewfinder Type	Black-and-White	Colour
Edit Remote Control	Optional	Provided
The appearance of the viewfinder is different as shown in the photos on the cover.		

FEATURES

Water-resistant
Because your video camera/recorder is water-resistant, it allows recording on a ski slope even when it is snowing, outdoors when it is raining and, at the poolside where water could splash.

Single-Unit Convenience and Ease of Operation
Your camera/recorder combines the functions of a video camera and a video tape recorder in one lightweight, easy-to-use instrument. This eliminates interconnecting cables and simplifies operation.

Record and Playback Capability

Record — Your camera/recorder can record directly from the built-in video camera.

Playback — Video/audio played back by the video recorder or fed directly from the camera may be viewed and heard on a TV receiver/monitor by using the AV stereo output cord.

Digital Zoom up to X24

Electronic Image Stabilizer (EIS)
This function corrects slight shaking when zooming in on a distant subject.

Colour Electronic Viewfinder (EVF)
(Only for VM-H71E)
You can check the colour of the subject in the viewfinder while recording.

Programme AE (Auto Exposure)
The camera automatically determines the shutter speed and aperture according to the brightness of the subject.

Auto Focus Power Zoom Lens
The X12 autofocus zoom lens uses video auto focus system to automatically maintain focus and to allow you to zoom in and out for tele or wide angle shots at just the touch of the zoom button.

Wireless Remote Control is provided

Fade-in/Fade-out
Use this function to make the picture appear and disappear gradually. You can select three fade modes — fading-in from a white picture (white fading), fading-in from a black picture (wipe fading) and fading-in while zooming (zoom fading).

Stereo Microphone built-in

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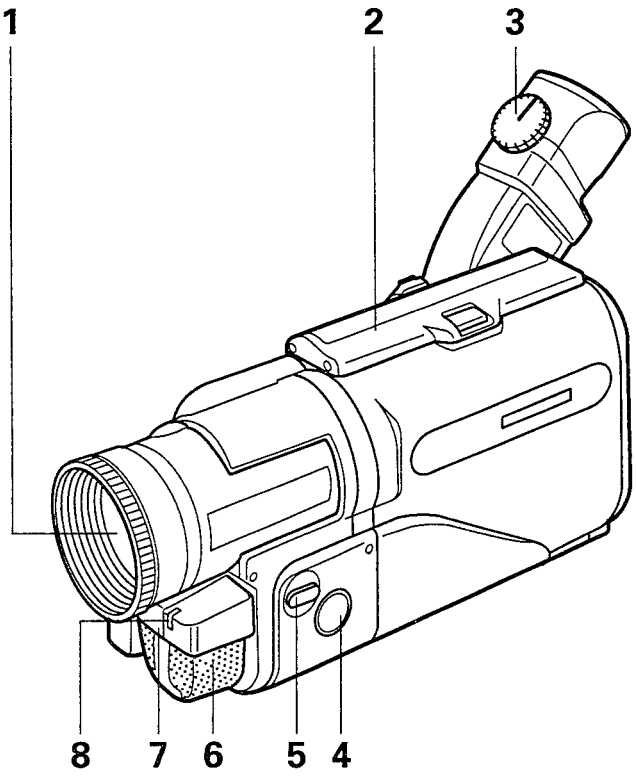
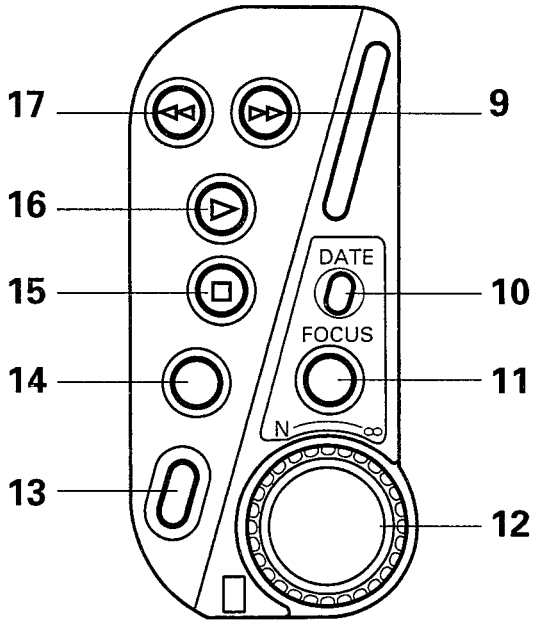
CONTROLS AND FUNCTIONS





1. Lens
F1.8 (5 ~ 60mm) X12 power zoom lens features with auto focus and auto iris functions.

2. Buckle
Lock the buckle to close the case tightly before recording so that no water droplets or sand can get inside.

3. Diopter Control
To use the electronic viewfinder, turn this control for your optimum focus adjustment.

4. FADE Button
During recording you can add a professional touch to your recordings by fading in and out of the scenes. You can select the three fade modes — the white fade, wipe fade and zoom fade.

5. EIS (Electronic Image Stabilizer) Button
Press to display " " in the viewfinder. EIS corrects slight shaking of the image to be recorded.

6. Stereo Microphone
Sensitive to sounds coming from the direction in which the camera is pointed.

7. Infrared Ray Receiving Section
Receives infrared rays from the remote control unit.

8. Record/In-Camera Battery Charge Indicator
This indicator lights (red) during recording and lights (green) when the battery inside the camera/recorder is being charged.

9. F.FWD Button
Press this button during stop or rewind mode, and fast-forwarding starts. Press the button during playback of tape, and the tape is played back in the forward direction approximately 7 times faster than the normal speed to confirm the recorded content. Press PLAY button to return to normal playback mode or press STOP button to stop tape movement. Also use F.FWD button when setting the date/time.

NOTE: You can also visually scan forward when the camera/recorder is in record/pause (stand-by) mode by pressing and holding this button.

10. DATE Button
Press this button to display the date and time in the viewfinder. Whenever the date and time appear in the viewfinder, they will be recorded on the tape.

11. FOCUS Select Button
Press this button to switch between automatic and manual focusing.
If this button is pressed and "FOCUS" appears in the viewfinder, the camera/recorder enters the manual focus mode. When "FOCUS" is not displayed, focusing is automatic.

12. Focus Control
For manual focusing, rotate this control to bring the subject into focus.

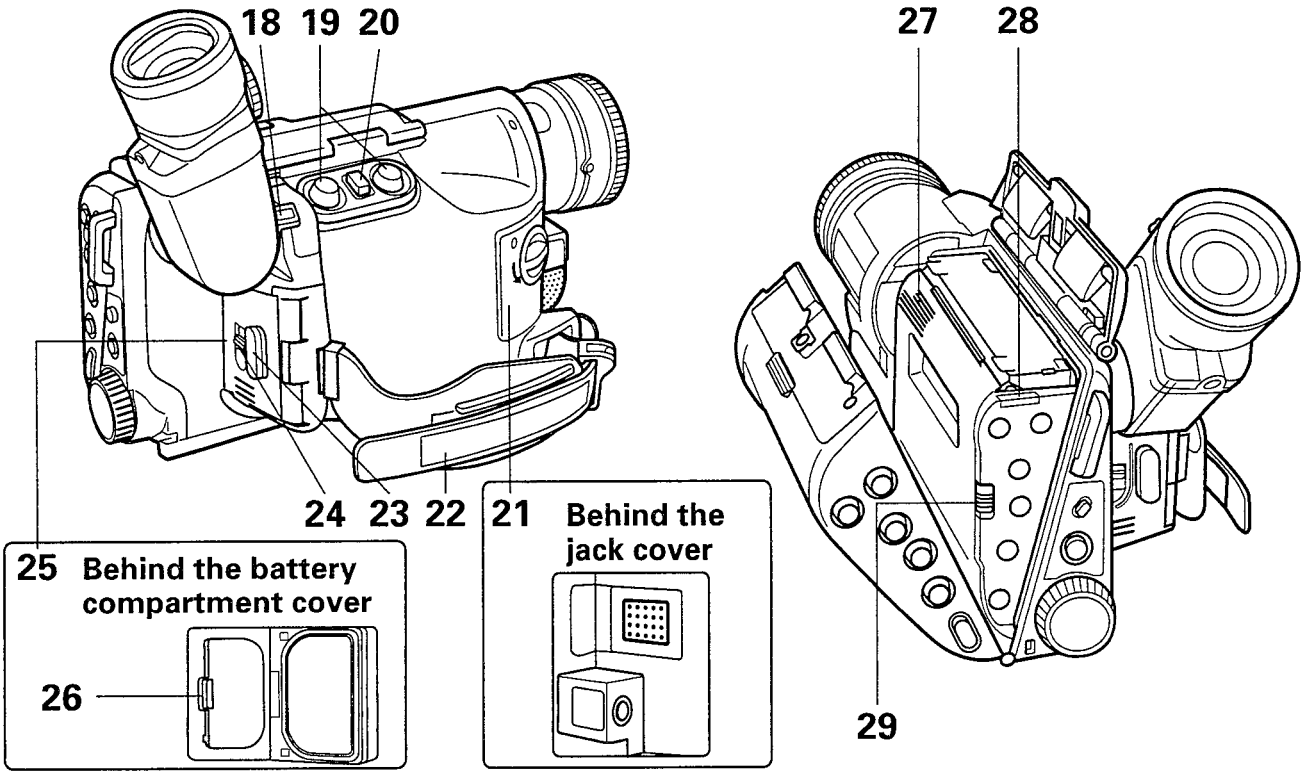
13. B.LIGHT Button
When the subject is lit from behind, press and hold this button to compensate for the back-lighting.

14. 16x9 button
Press to fade the top and bottom of the picture to black.

15. STOP Button
The STOP button is used to stop playback, rewind, and fast forward operations. The STOP button has no effect during record operation. Also use STOP button when setting the date/time.

16. PLAY Button
Used for playback of tape.
NOTE: When the camera/recorder is in record/pause (stand-by) mode, pressing and holding this button will play the tape at normal.

17. REW Button
Press this button during stop or fast forward mode, and fast-rewinding starts. Press the button during playback of tape, and the tape is played back in the



rewind direction approximately 5 times faster than the normal speed to confirm the recorded contents. Press PLAY button to return to normal playback mode or press STOP button to stop tape movement. Also use this button to review the last few seconds of the tape you are recording. Use REW button when setting the date/time.
NOTE: You can also visually scan backward when the camera/recorder is in record/pause (stand-by) mode by pressing and holding this button.

18. OPERATE Switch
This turns the camera/recorder on and off and also switches between the camera and VCR modes.
Set the switch to "CAM" to turn the camera's power on and to "VIDEO" to turn the VCR's power on.
Press and hold the small red button in the switch to switch it.

19. Power Zoom Switch
This switch performs zooming electrically.
"W": Picture becomes wider gradually.
"T": Picture becomes telescopic gradually.
NOTE: Pressing the power zoom switch strongly results in rapid zooming and pressing it lightly results in slow zooming.

20. INST. ZOOM (Instant Zoom) Button
Use this button to magnify the image being recorded 1.5 times momentarily.

21. AV OUT Jack/EXT MIC Jack or Remote Jack (Behind the jack cover)
"AV OUT" Jack: Use the stereo output cord (provided) or RF output adapter (optional) to connect this jack to a TV to view the pictures played back by the camera/recorder.
"EXT MIC" Jack or Remote Jack: Connect an external microphone (not supplied) here to record sound from the external microphone. Also connect the edit remote control (optional with the VM-H70E or provided with the VM-H71E) here.
NOTE: Connecting an external microphone automatically switches off the built-in microphone.

22. Hand Strap
Adjust to best fit to your hand. (Refer to page 11)

23. Start/Stop Button
This button is used to control the camera/recorder. When the record mode select switch is in the "START/STOP" position, pressing this button in the record pause (standby) mode runs the tape to start recording. When the button is pressed again, the tape stops and the camera/recorder enters the record pause mode.
When the record mode select switch is set to "HOLD TO REC", the camera/recorder records while the Start/Stop button is held depressed and it enters the record pause mode when the button is released.
The Start/Stop button may also be used to display a still picture during the playback mode.

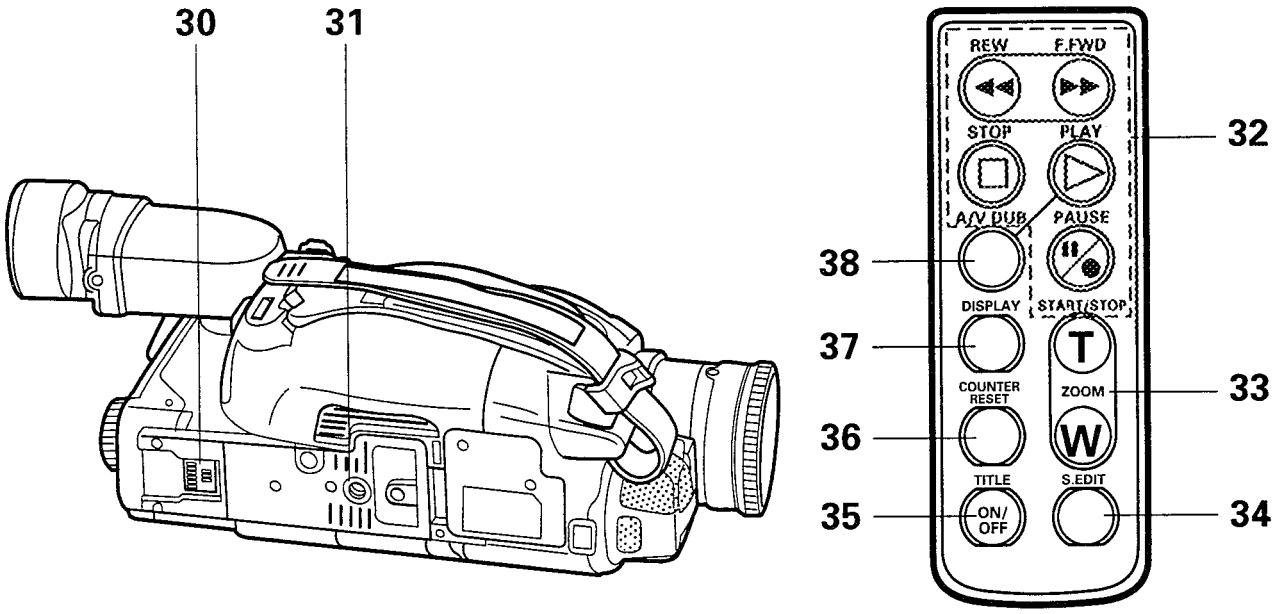
24. BATT. EJECT (Battery Eject) Lever
Slide this lever to open the battery compartment lid when loading a battery and removing it.

25. Battery Loading Compartment
Load the battery (provided) here.

26. Battery Release Lever (blue)
Press this lever to remove the battery from the camera/recorder.

27. Cassette Holder
Press EJECT button to open the cassette holder. Be aware of the cassette direction when inserting.
NOTE: Power source must be connected to open the cassette holder.

28. EJECT Button
Operates with OPERATE either on or off, if a power source is connected to the camera/recorder.



29. Record Mode Select Switch
"START/STOP": Pressing the Start/Stop button alternates between recording and recording pause.
"HOLD TO REC": The camera/recorder is set to recording while the Start/Stop button is held depressed and it enters recording pause when the button is released.

30. External Power Adapter Attachment Section
Attach the external power adapter (provided) here.

31. Tripod Mount Screw
Use this screw to mount the camera/recorder on a tripod (generally available).

32. Camera/Recorder Control Buttons
These shaded buttons on the remote control function the same as those on the camera/recorder.

33. Zoom Switch
This switch performs zooming electrically.
"W": Picture becomes wider gradually.
"T": Picture becomes telescopic gradually.
Note: The zoom switch on the remote control cannot change the zoom speed, but provides only low-speed zooming.

34. S. EDIT (Synchro Edit) Button (only on the remote control)
Use this button to activate the synchro edit function for dubbing.

35. TITLE ON/OFF Button (only on the remote control)
Use this button to store a title in memory or recall the stored title and record it superimposed on the picture being shot.

36. COUNTER RESET Button (only on the remote control)
Press this button to reset the linear time counter in the viewfinder to "0:00:00".

37. DISPLAY Button (only on the remote control)
Use this button to select the display in the viewfinder.

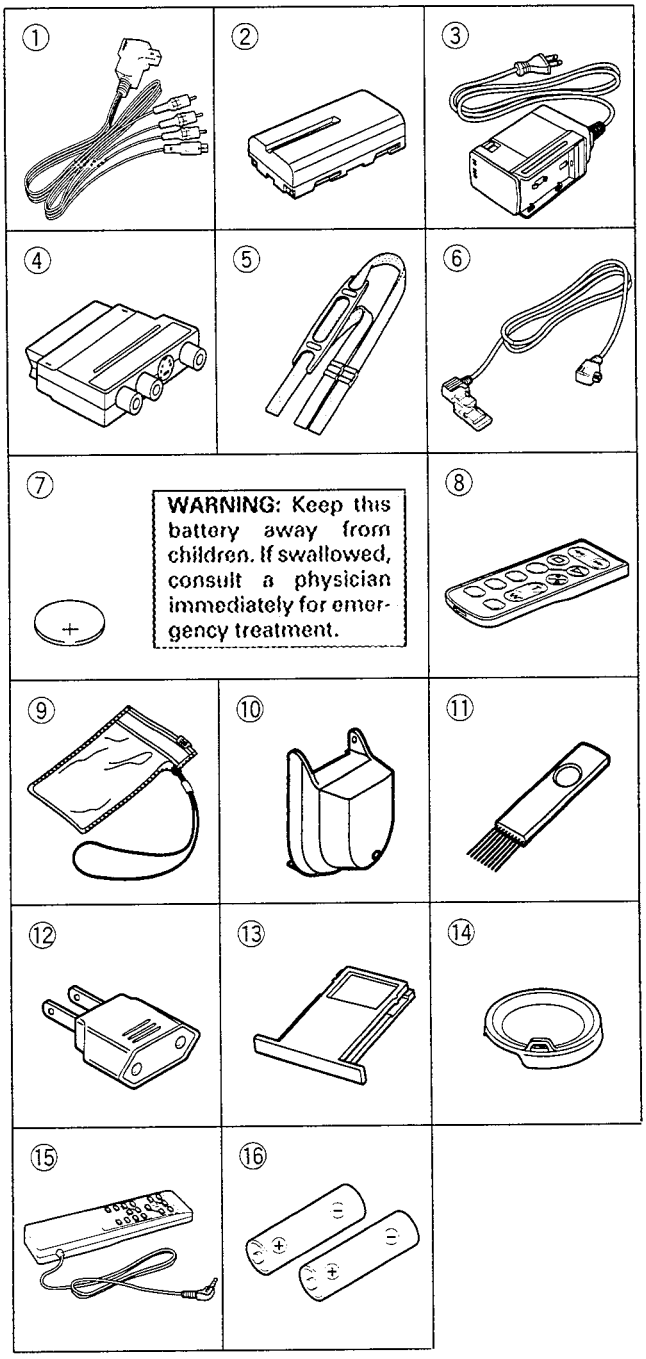
38. AV DUB Button (only on the remote control)
This button is used to record new audio and video in place of existing audio and video.

ACCESSORIES

Check to make sure you have the following components and accessories (besides the camera/recorder unit itself) before disposing of the packing material.

1. AV Stereo Output Cord with S-VIDEO plug
2. Battery Pack
3. AC Adapter/Charger
4. AV Plug Adapter (Peri) with S-VIDEO socket
5. Shoulder Strap
6. External Power Adapter
7. Battery for Remote Control (CR2025)
8. Remote Control
9. Remote Control Case
10. Microphone cap
11. Brush
12. AC Plug Adapter
13. Terminal Cover
14. Lens Cap
15. Edit Remote Control (only for VM-H71E)
16. Two IEC R6 batteries for Edit Remote Control (only for VM-H71E)

NOTE: Use the microphone cap to protect the microphone from impacts when carrying the camera/recorder or the entrance of water when maintaining it. Remove the cap when recording. Otherwise, sound cannot be recorded.

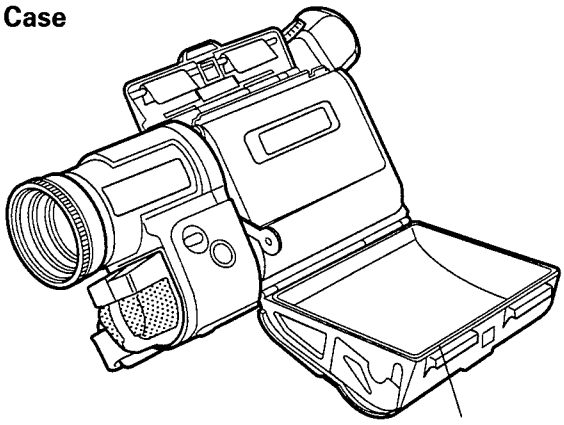


WATER-RESISTANT

■ **Water-resistant structure**

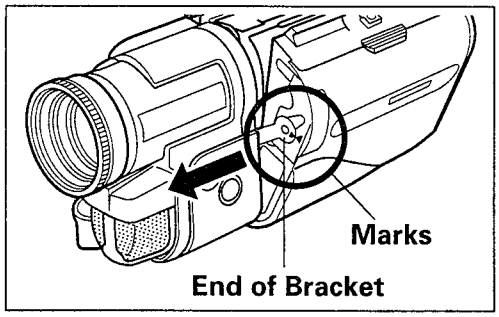
Your camera/recorder uses three packings as shown below to provide a water-resistant structure.

Case



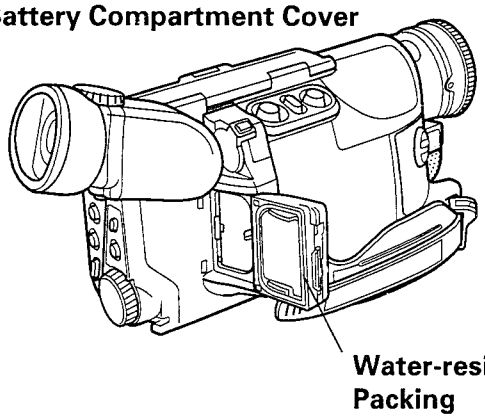
Water-resistant Packing

- **To check the packing**



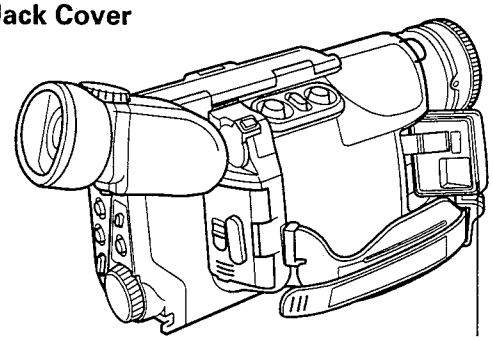
1. Open the case so the end of the bracket is positioned as shown in the figure and pull the bracket forward to release it.
2. After checking, replace the bracket to its original position.

Battery Compartment Cover



Water-resistant Packing

Jack Cover



Water-resistant Packing

CAUTION

■ **How to handle the water-resistant packings**

- Inspect the water-resistant packings constantly to check that there are no scratches or chipping as they could cause water to enter.
- Check that no foreign matter adheres to the water-resistant packings before closing the cases. If the camera/recorder is used while dust, sand or thread adheres to only one point of the packings, it could cause water to enter.
- The water-resistant packings are expendable supplies.
  It is recommended to replace them once a year.
- Consult your nearest dealer to replace the packings.

■ **The camera/recorder cannot be used in the following places**

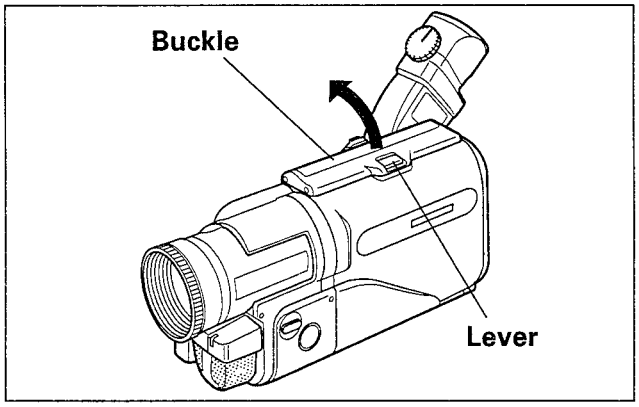
- Under water
- In a place at high temperature and high humidity such as in a sauna, bathroom, etc.
- Where water would strike it violently (where water pressure is applied)
  NOTE: The camera/recorder cannot be used under water because it is not waterproof.

■ **Be careful when opening and closing the sections with packing**

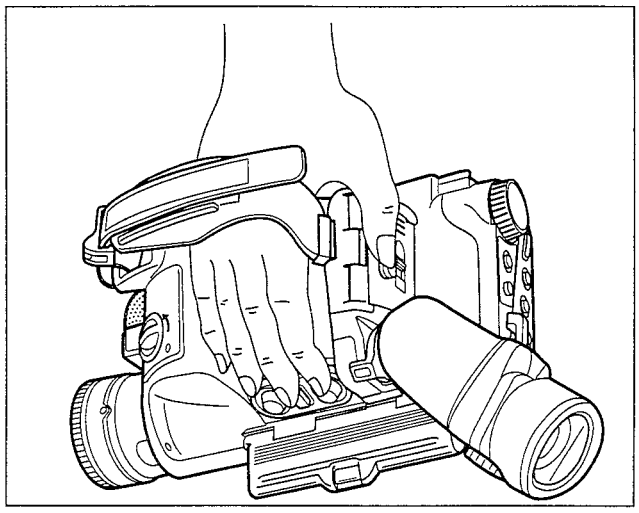
- The camera/recorder inside the case is not structured to be water-resistant. Take great care that no water droplets enter inside.
- Check that the three sections with packing are closed tightly to ensure that it is water-resistant.

■ How to open and close the case

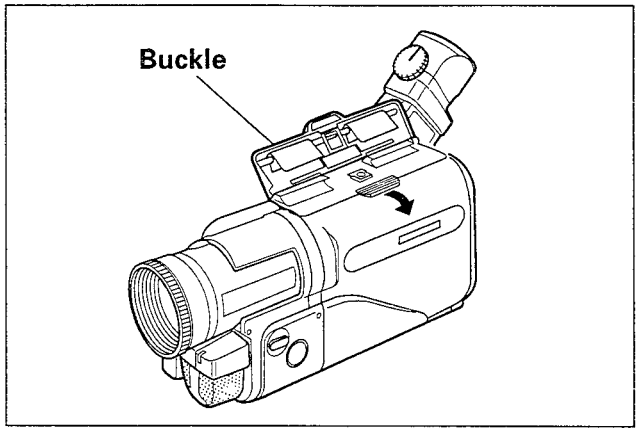
1. Push the lever on the buckle and hold it, then release the buckle in the direction of the arrow.



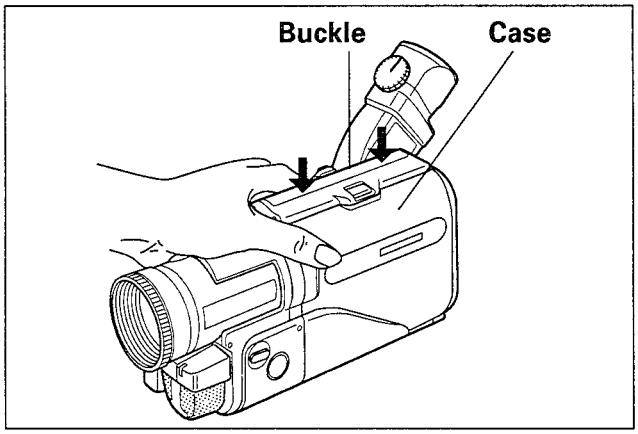
NOTE: After using the camera/recorder, wipe off the sand or water droplets carefully from the case before opening it. Since water droplets or sand may remain under the buckle, release the buckle in the condition shown in the figure and wipe off the water droplets or sand carefully.



2. Open the case in the direction of the arrow.

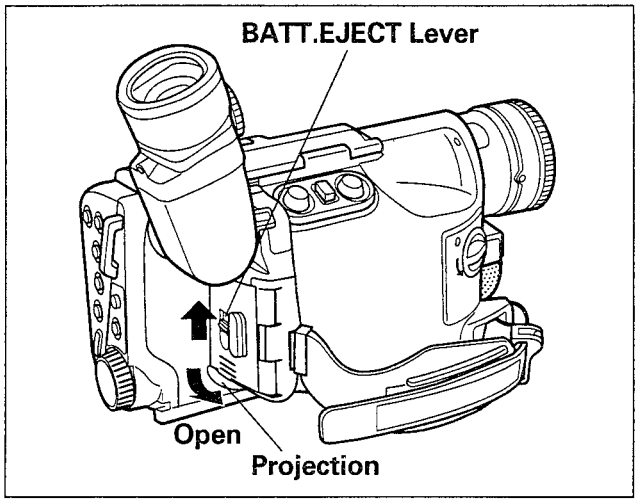


3. To close the case, hold the left and right cases tightly and close the buckle until a click is heard.
   NOTE: Lock the case securely using the buckle. Otherwise, it could allow water to enter.

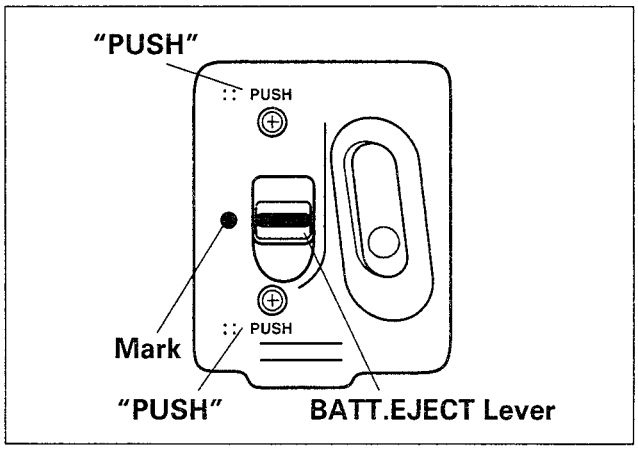


■ How to open and close the battery compartment cover

1. Push the BATT. EJECT lever in the direction of the arrow to unlock the cover. Pull the cover forward to open it.

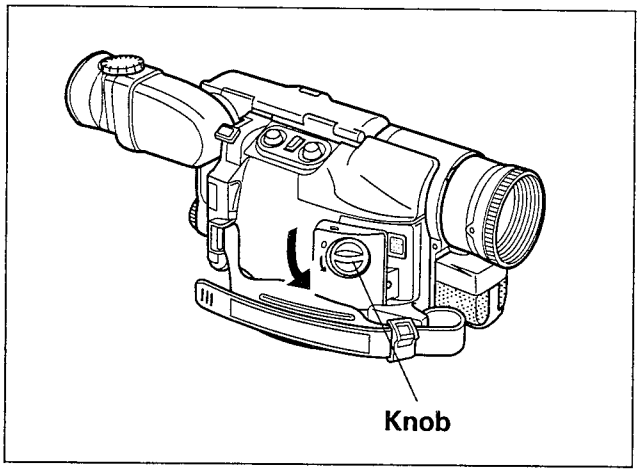


2. To close the battery compartment cover, press both sections marked "PUSH" simultaneously and make sure that a click is heard. Also check that the BATT. EJECT lever is aligned with the mark as shown in the figure below.

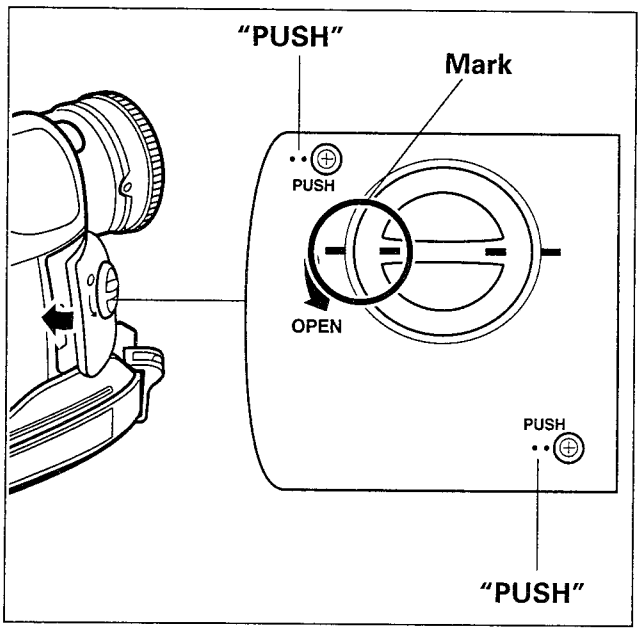


■ How to open and close the jack cover

Turn the knob on the jack cover in the direction of the arrow to open the cover.



To close the jack cover, press the two sections marked "PUSH" and make sure that a click is heard. Also check that the knob is aligned with the mark as shown in the figure below.



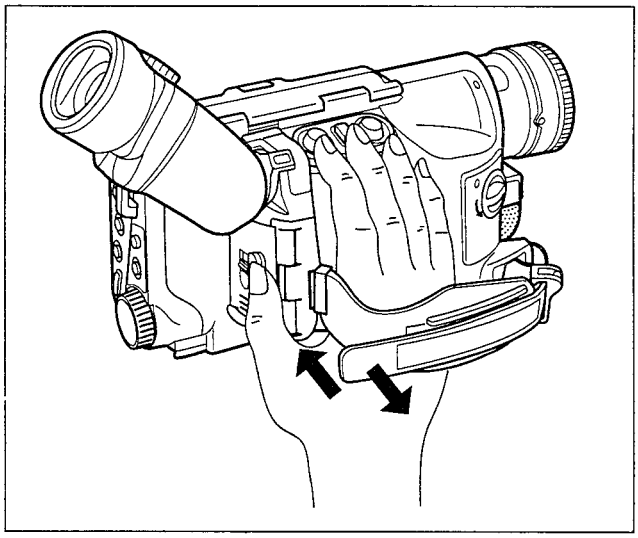
■ To prevent condensation

- When the camera/recorder is moved from a cold place to a warm place, leave it for a while until it reaches the ambient temperature before opening the case.
- Be careful that no water droplets or snow flakes enter when opening the case. If they enter, the humidity inside rises and condensation is likely to occur.
- Moisture also condenses on the lens. If moisture condenses on the lens, clear pictures cannot be recorded.
- Dry the camera/recorder with the case open and use it after condensation on the lens disappears.
- Open the case if there is condensation. Otherwise, it is hard to dry the camera/recorder.

ADJUSTING THE HAND STRAP

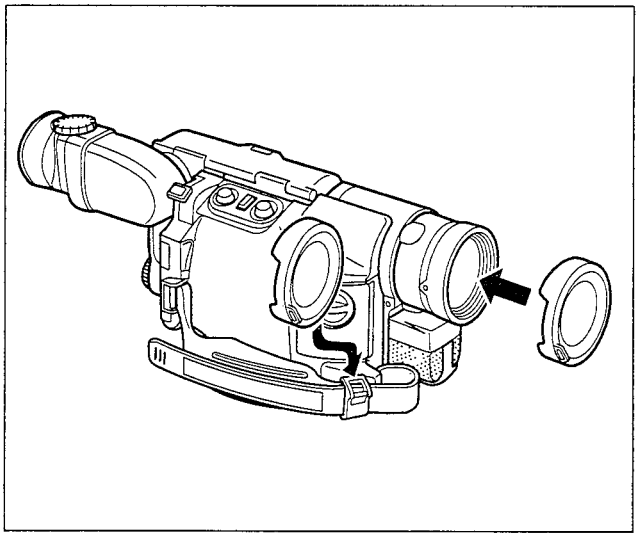
Adjust the hand strap, as illustrated.

Adjust the length of the hand strap so you can press the Start/Stop button and power zoom switch easily with your fingers.



LENS CAP

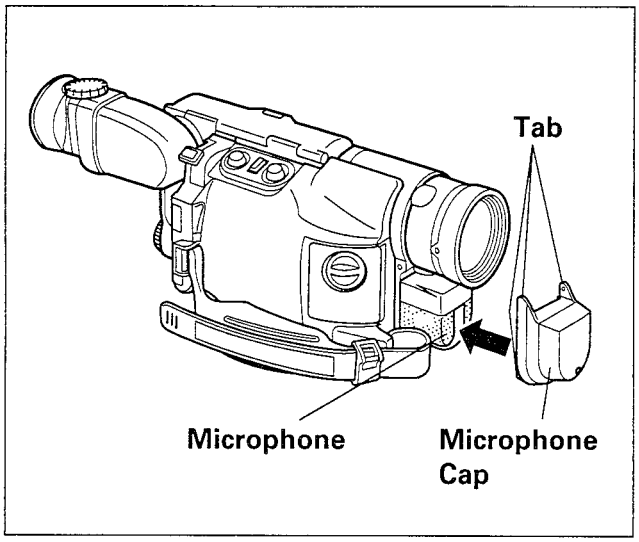
Attach the lens cap to protect the lens when carrying or storing the camera/recorder. During shooting attach the lens cap as shown in the figure to prevent it from being lost.



USING THE MICROPHONE CAP

Be sure to attach the microphone cap when you rinse the camera/recorder with water after using it. If water pressure is applied to the microphone directly, it could cause damage the microphone.

Position the microphone cap as shown in the figure and put it on the microphone securely until a click is heard.

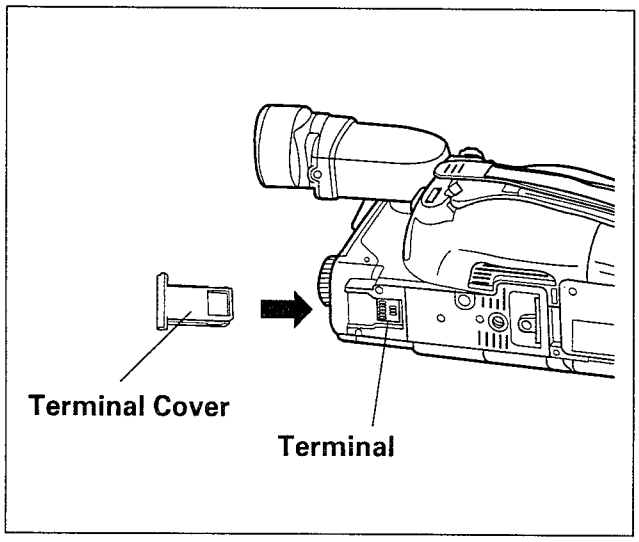


ATTACHING THE TERMINAL COVER

The terminal cover protects the terminal at the bottom of the camera/recorder to which the external power adapter is to be attached, from damage, dirt, dust, etc.

Attach the terminal cover if you are not using the external power adapter.

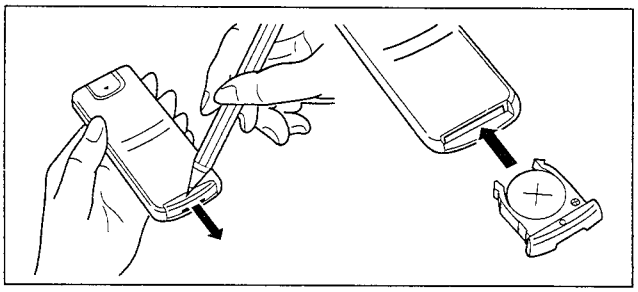
NOTE: Before attaching the terminal cover, check that there is no sand, water or dirt adhering to the terminal. If anything adheres to the terminal, use the brush (provided) or a soft cloth to wipe it off completely.



LOADING BATTERY FOR REMOTE CONTROL

You may want to install the remote control battey (provided) immediately to prevent losing it.

1. Pull the battery holder from the remote control (provided).
2. Place the battery as illustrated, and then attach the holder to the remote control.



NOTE: When replacing the battery, use 3V micro lithium battery Maxell CR2025.

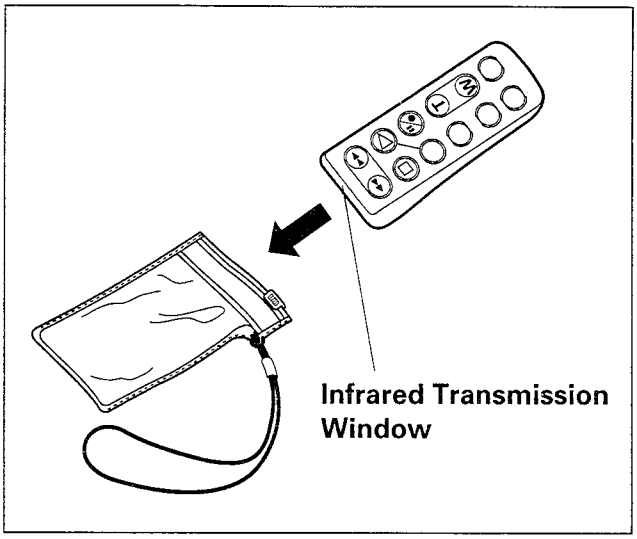
This product uses a lithium battery which contains dangerous chemicals. Handle and dispose of with great care.

WARNING

- Do not throw in a fire.
- Do not short circuit it.
- Do not disassemble it.
- After use please bring back to retail shop.

USING THE REMOTE CONTROL CASE

The remote control is not water-resistant. If you use the remote control for recording when it rains or snows or where it could be splashed by water, insert the remote control into the case with the infrared transmission window forward as shown in the figure. You can use the remote control while it is in the case.



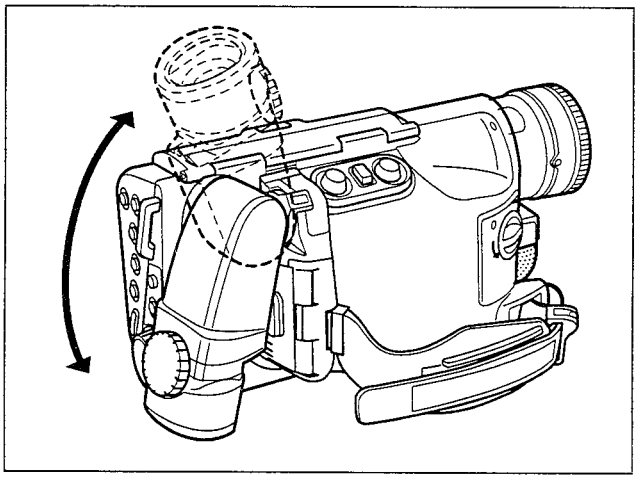
ELECTRONIC VIEWFINDER POSITION ADJUSTMENT

Adjust the electronic viewfinder to a position where you can see through it easily.

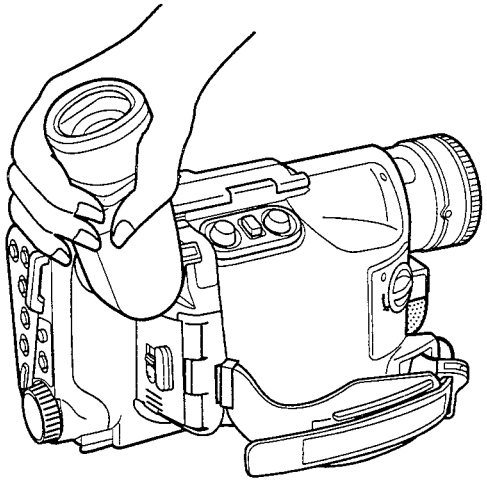
NOTES:

- Put the viewfinder back to original position when storing the camera/recorder into the carrying case or carrying the camera/recorder.

- Do not point the electronic viewfinder to direct sunlight; it could damage the viewfinder.

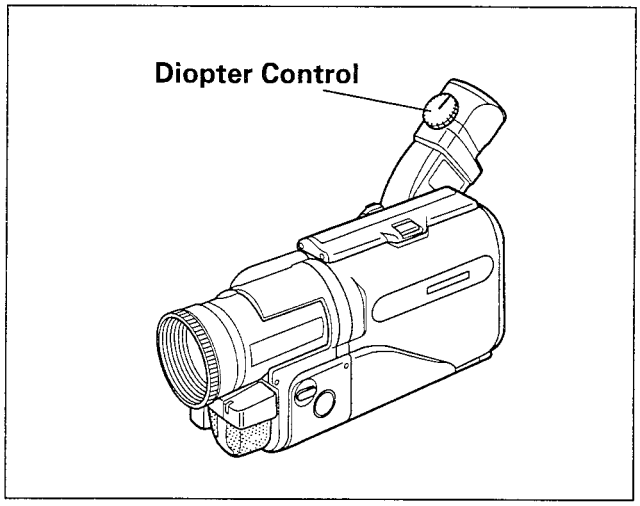


CAUTION:
Do not hold the unit by the electronic viewfinder when carrying as this could cause a malfunction.



EYEPIECE ADJUSTMENT

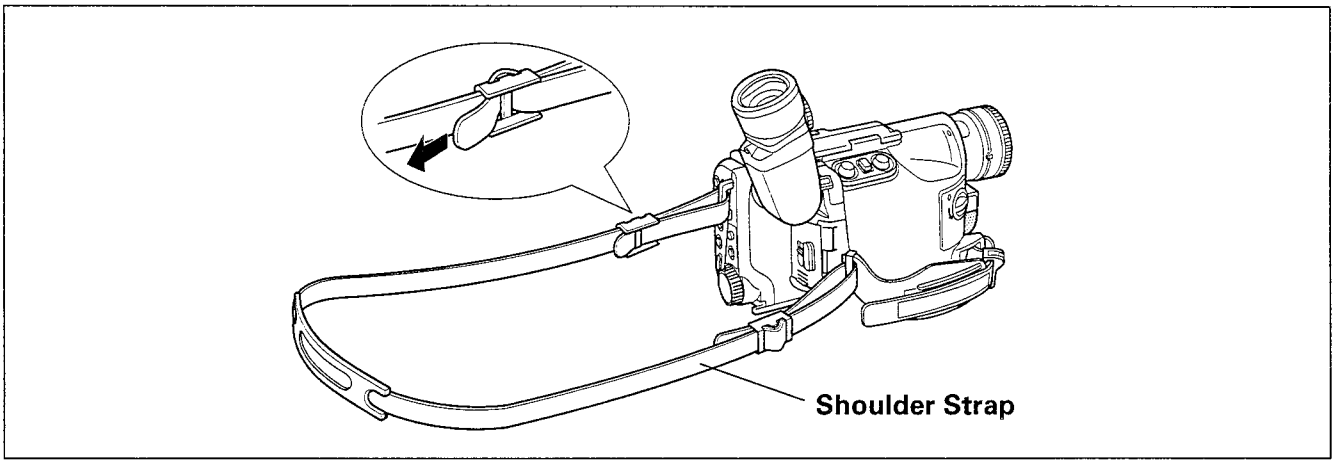
To use the electronic viewfinder without eyeglasses on, adjust the diopter control for optimum focus adjustment.



HOW TO INSTALL THE SHOULDER STRAP

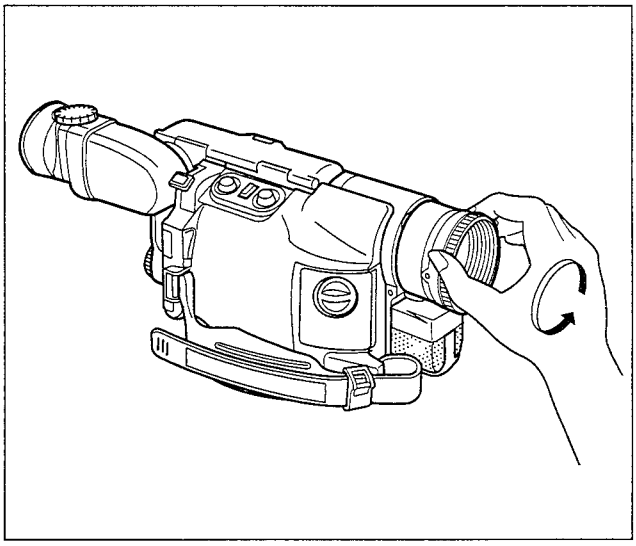
Attach the shoulder strap as illustrated below.

NOTE: When carrying the camera/recorder with the shoulder strap, put the electronic viewfinder down to its original position so that direct sunlight does not enter the viewfinder.

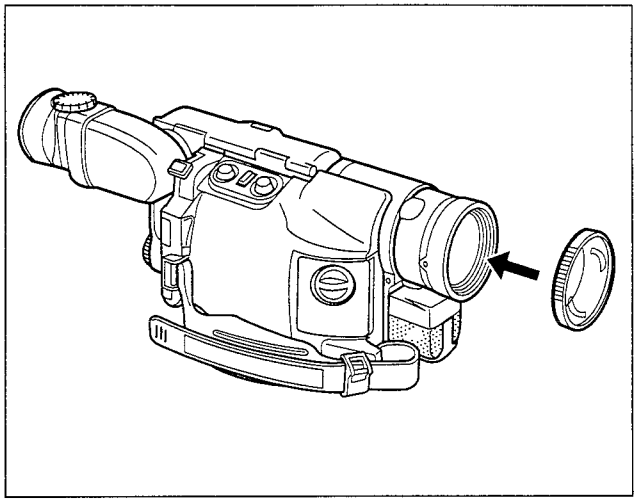


ATTACHING THE TELE OR WIDE CONVERTER

1. To remove lens hood, turn it counterclockwise.



2. Remove both caps of the tele or wide converter.
3. Screw the lens into the threads on the front of video camera/recorder lens assembly.



PROGRAMME AE (Auto Exposure)

Programme AE automatically selects the shutter speed 1/50, 1/100, 1/150, 1/250, 1/350, 1/500, 1/750, 1/1000, 1/1500, 1/2000 or 1/4000 second that is optimum for the brightness of the subject. The iris is also adjusted automatically in response to the shutter speed.

FLYING ERASE HEAD

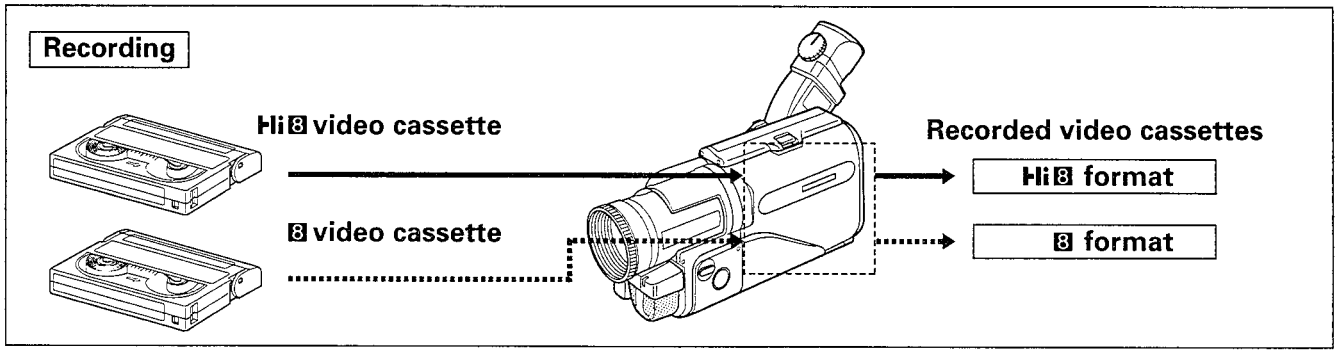
A rotating erase head which eliminates glitches and rainbow noise that occurs at the joints between recordings in previous models.

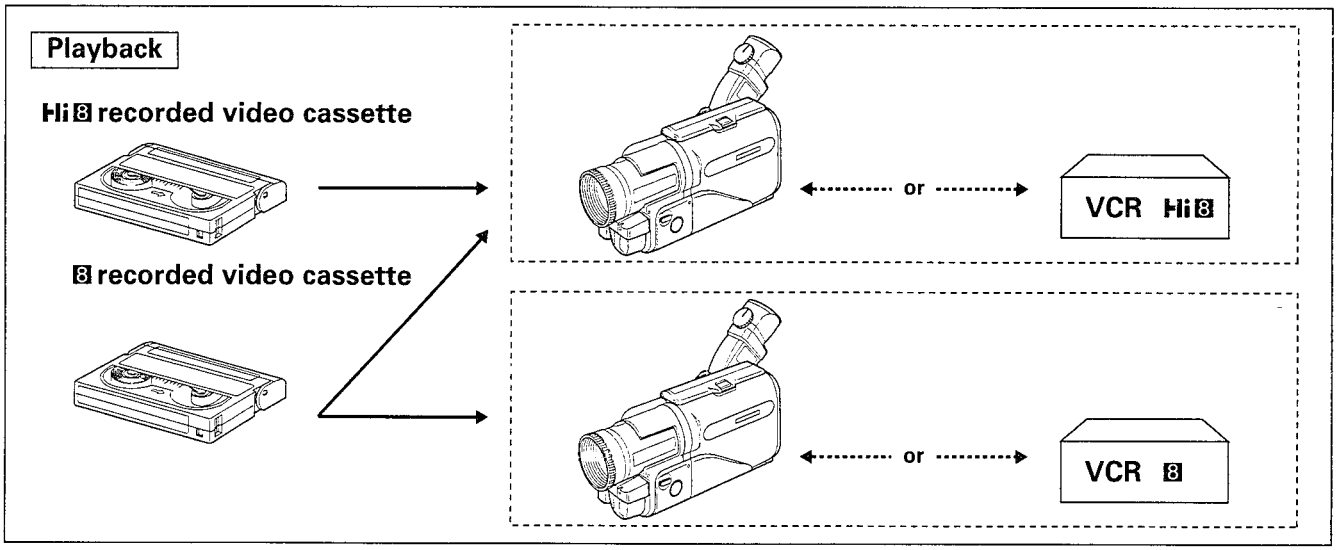
Hi8

Hi8 has realized high resolution and high picture quality when compared to the standard 8 format.

The camera/recorder discriminates the type of the video cassette to be recorded automatically. If it detects a Hi8 video cassette, it records in the Hi8 format, and if it detects an 8 cassette, it records in the 8 format. Select the type of the cassette to be used before recording.

■ Compatibility with conventional video camera/recorder

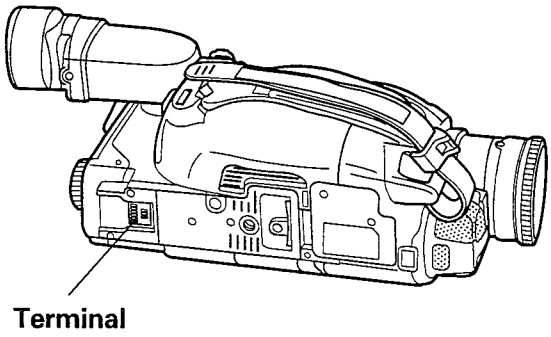




- During playback, the recording format is discriminated automatically and video cassettes are played back correctly.
- Video cassettes recorded in the Hi8 format cannot be played back by an 8 VCR.

NOTES

- Be sure to turn off power of the camera/recorder when attaching or detaching a power supply (battery, AC adapter/charger, etc.) to/from the camera/recorder.
- Before attaching the external power adapter, check that there is no sand, water or dirt adhering to the terminal of the attachment section. If anything adheres to the terminal, use the brush (provided) or a soft cloth to wipe it off completely.

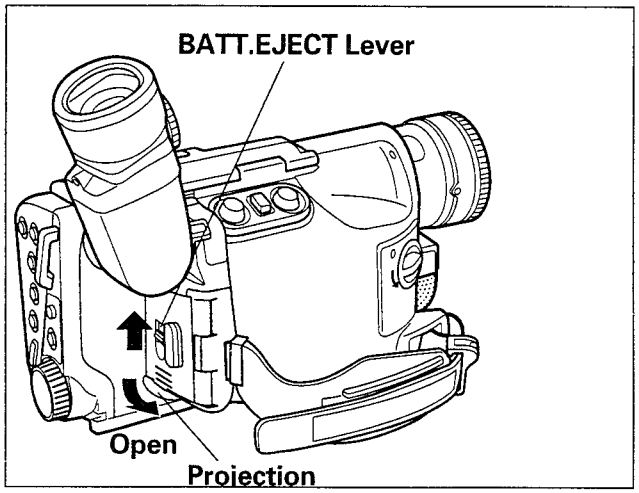


■ WHEN USING WITH THE BATTERY (provided)

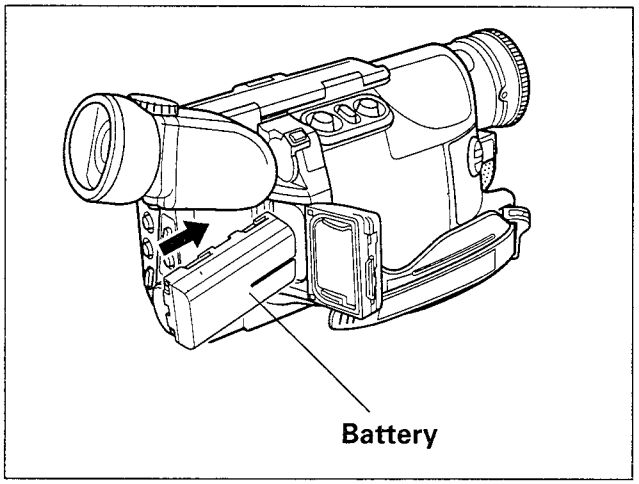
NOTE: The battery must be charged before it can be used for the first time. Refer to "CHARGING THE BATTERY" on page 18.

Loading the battery

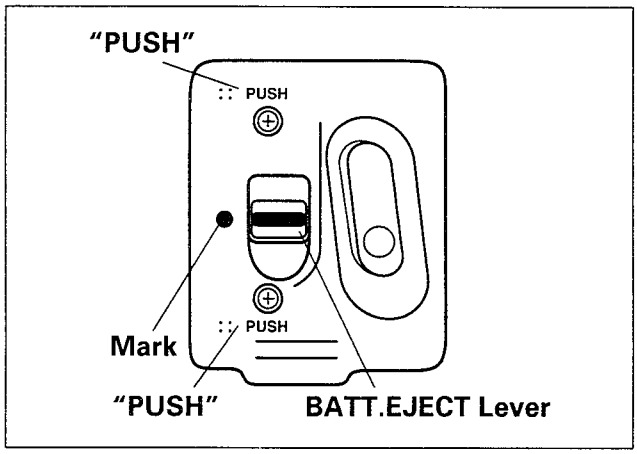
1. Push the BATT. EJECT lever in the direction of the arrow to unlock the battery compartment cover. Pull the projection forward to open the cover.



2. Insert the battery with the correct orientation all the way until a click is heard.

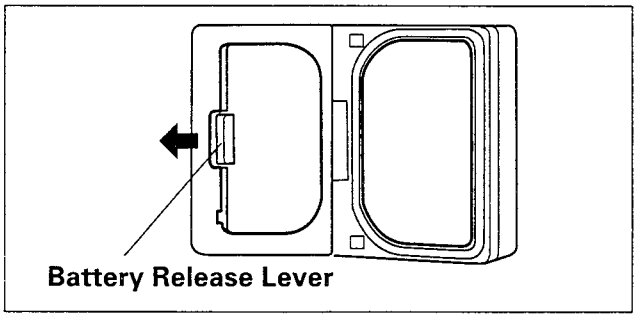


3. Close the cover firmly.
   NOTE: Check that the BATT. EJECT lever is aligned with the mark after closing the cover. If the cover is not closed securely, water or dust may enter the battery compartment.



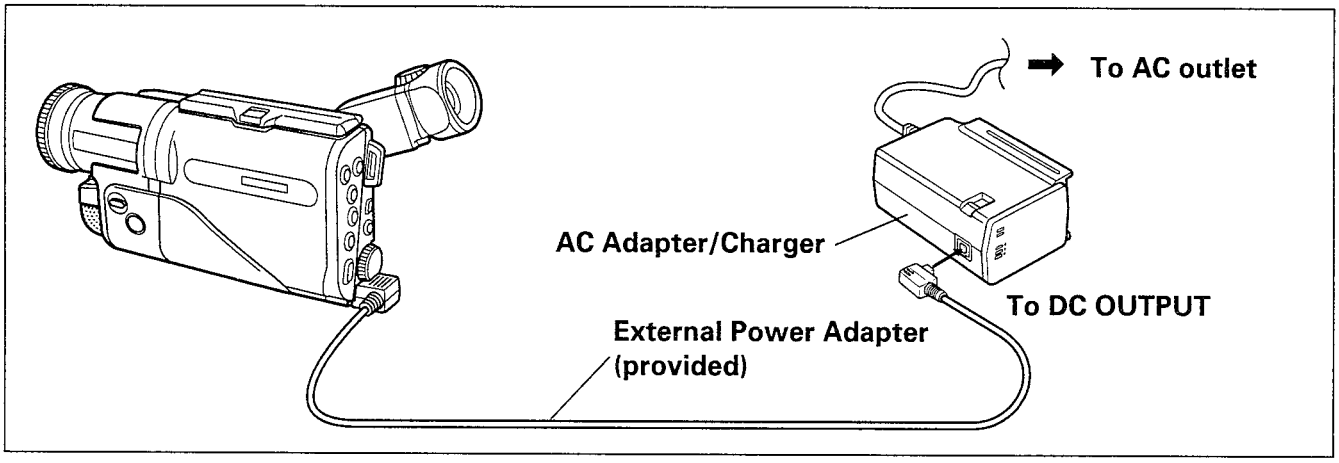
■ Removing the battery

1. Push the BATT. EJECT lever to open the battery compartment cover.
2. Push the battery release lever in the direction of the arrow; the battery will come out. Pull the battery forward to remove it.



NOTE: The battery is ejected by the force of a spring. Be careful not to drop the battery.

■ WHEN USING WITH THE AC ADAPTER/CHARGER (provided)



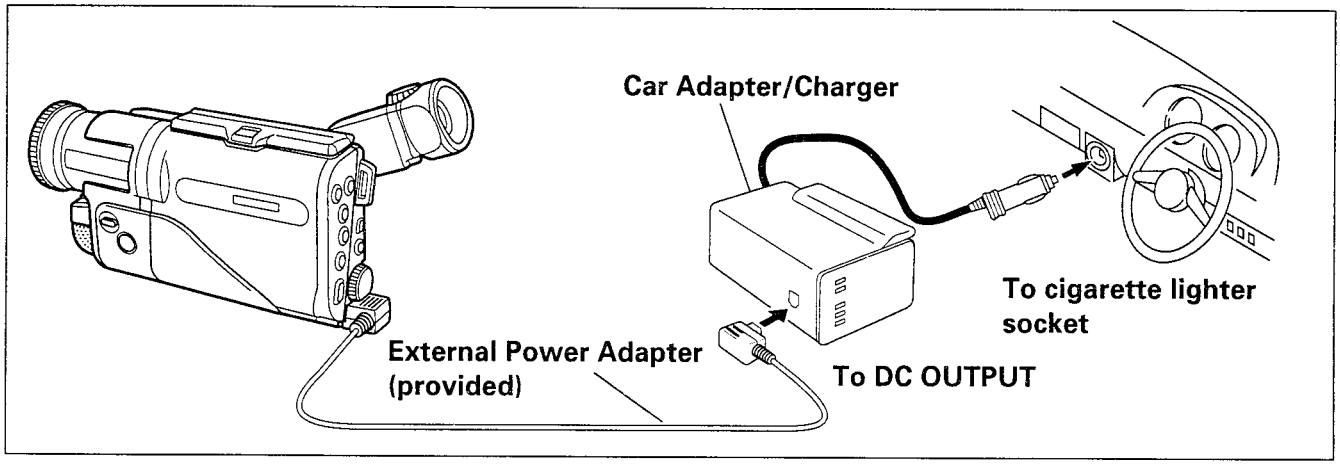
1. Attach the external power adapter (provided) to the camera/recorder as shown in the figure.
2. Connect the external power adapter plug to the DC OUTPUT jack of the AC adapter/charger.
3. Plug the AC adapter/charger power cord into an AC electrical outlet; the POWER indicator on the AC adapter/charger will come on.
4. To remove the external power adapter from the camera/recorder, pull it gently.

See the bottom of the AC adapter/charger. The rating label is located on the bottom of the AC adapter/charger.

NOTES:

- This AC adapter/charger is universal for use with AC 110— 240V around the world. If you use the camera/recorder in some foreign countries, the AC plug adapter (provided) may be necessary.
- The AC adapter/charger cannot charge the battery and operate the camera/recorder at the same time.

■ WHEN USING WITH THE CAR BATTERY (By using optional car adapter/charger)



1. Connect the external power adapter (provided) to the camera/recorder, as illustrated.
2. Connect the small plug of the external power adapter to DC OUTPUT of the car adapter/charger.
3. Connect the car adapter/charger to a car's cigarette lighter socket. The power indicator lights.

NOTES:

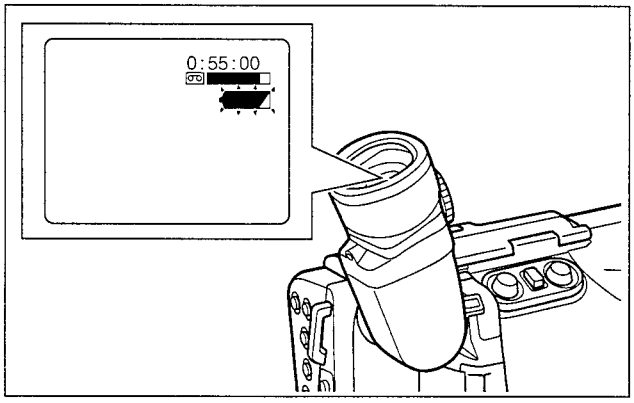
- The car adapter/charger is designed to be used only with automobiles having a 12/24-volt negative ground system.
- To prevent fire or shock hazards or damage to your camera/recorder, use only the specified car adapter/charger.

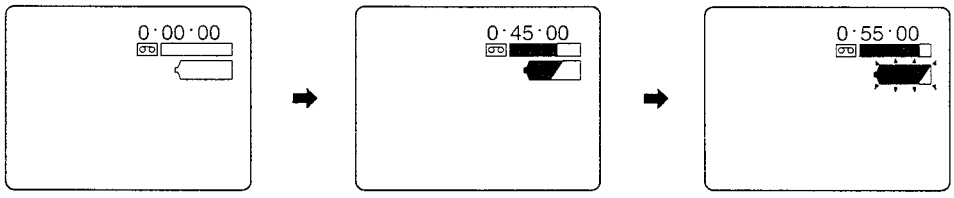
CHECKING THE BATTERY PACK

When the " ▰ " indication in the electronic viewfinder appears and flashes while the video camera/recorder is operated with the battery pack (provided), it indicates that the battery charge is insufficient. Charge it or replace it with a charged battery pack.

NOTE: When the camera/recorder is turned on, the battery level indicator " ▭ " is displayed in the viewfinder indicating the condition of camera/recording battery. When the battery is fully charged, " ▭ " is displayed.

After several minutes, the symbol will change to " ▰ ". When the battery is very near empty, the symbol will change to " ▰ " and start blinking. You should find an alternative power source or recharge the battery before continuing to use your camera/recorder.

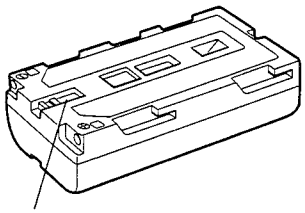




CHARGING THE BATTERY

NOTES:

1. Charge the battery before using it. A battery that is not fully charged can be used according to the time it has been charged.
2. Charge the battery at an ambient temperature of 10℃—30℃.
3. If the usable time of the camera/recorder becomes shorter with a fully charged battery, the life of the battery is ended.
4. Do not short the battery's terminals.
5. Do not disassemble the battery.
6. Do not throw the battery into a fire.
7. The battery has a charge check mark. Use this to determine whether it is charged or not. When the battery is unloaded from the camera/recorder, it has no mark, but the battery removed from the AC adapter/charger has a colour mark on it.



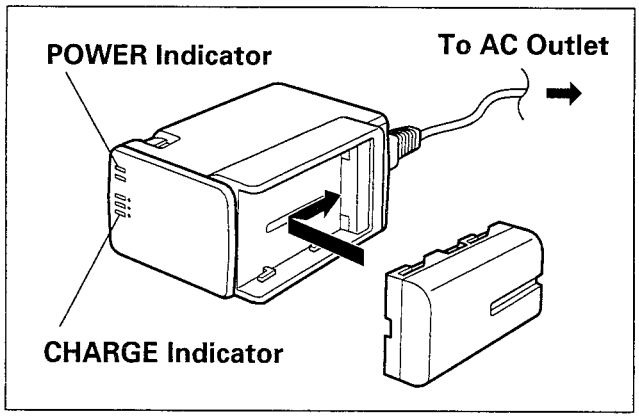
Marker

8. Do not use a battery with a crack or any abnormalities in its appearance.

■ To charge the battery attached to the AC adapter/charger (rapid charging)

Attach the battery directly to the AC adapter/charger to charge it rapidly.

1. Connect the AC adapter/charger plug to an AC outlet. The POWER indicator lights.
2. Slide the battery in the direction of the arrow as shown in the figure to attach it.
   Charging the battery will start. The CHARGE indicator lights as shown in the table below as charging progresses. The CHARGE indicator goes out when the battery is fully charged.



NOTE: When fully charged, the battery should provide 50~60 minutes of operating time (depending on how much you use zoom and pause).

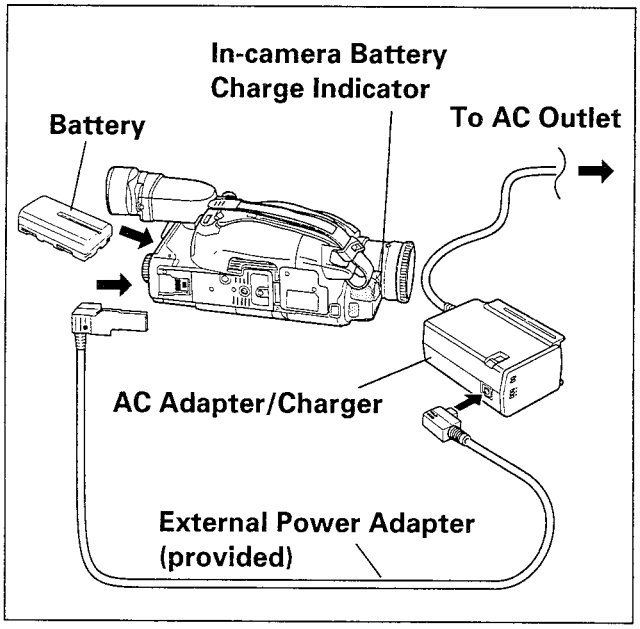
CHARGE indicator and charging time

CHARGE indicator	Charging time
	Charging starts
	About 30 minutes
	About 50 minutes
	About 90 minutes
	Charging complete About 150 minutes

■ To charge the battery loaded in the camera/recorder

You can charge the battery while it is loaded in the camera/recorder after recording is finished, etc. (Load a battery in the camera/recorder. Refer to "POWER SOURCES" on page 16.)

1. Set the OPERATE switch of the camera/recorder to "OFF".
2. Connect the external power adapter plug to the DC OUTPUT jack on the AC adapter/charger.
3. Attach the other end of the external power adapter to the installation section at the bottom of the camera/recorder.
4. Connect the AC adapter/charger plug to an AC outlet. The in-camera battery charge indicator lights (green) during charging. When charging is finished, the indicator goes out.



Charging Time

Charging Time
About 6 hours

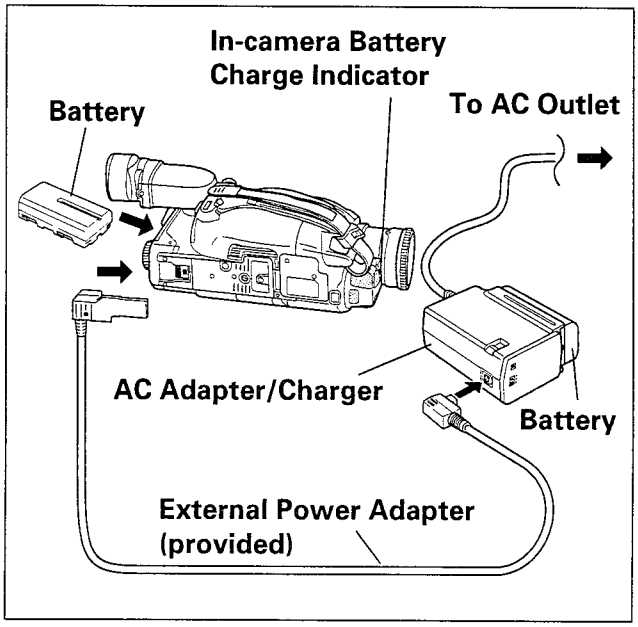
NOTES:

- The CHARGE indicator on the AC adapter/charger does not light.
- Charging is not done when the OPERATE switch on the camera/recorder is set to "CAM" or "VIDEO".
- When fully charged, the battery should provide 50~60 minutes of operating time (depending on how much you use zoom and pause).
- The camera/recorder becomes warm during charging, but this is normal.
- If the battery is left in the camera/recorder, the battery power will decrease even when the camera/recorder is not used. Do not leave the battery in the camera/recorder after charging it. Be sure to remove it.

■ To charge two batteries simultaneously

You can start charging the battery attached to the AC adapter/charger and the battery loaded in the camera/recorder simultaneously.

1. Set the OPERATE switch of the camera/recorder to "OFF".
2. Load a battery inside the camera/recorder.
3. Connect the external power adapter plug to the DC OUTPUT jack on the AC adapter/charger.
4. Attach the other end of the external power adapter to the installation section at the bottom of the camera/recorder.
5. Attach another battery to the AC adapter/charger.
6. Connect the AC adapter/charger plug to an AC outlet.
   The charge indicator on the AC adapter/charger and the in-camera battery charge indicator light, showing that the charging of both batteries has started.
   Since the AC adapter/charger provides rapid charging, its CHARGE indicator turns off first, showing that charging of the battery attached to it has finished. When charging of the battery in the camera/recorder has finished, the in-camera battery charge indicator turns off.



NOTES:

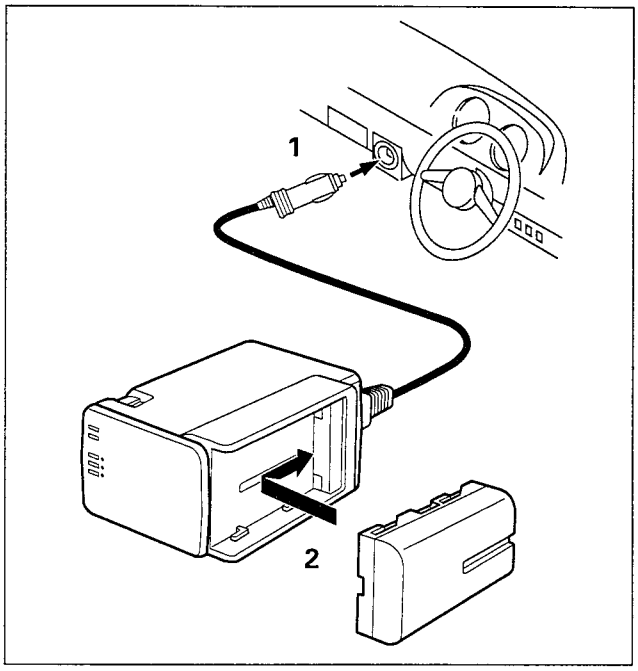
- When fully charged, the battery should provide about 50~60 minutes of operating time (depending on how much you use zoom and pause).
- The camera/recorder becomes warm during charging, but this is normal.

■ To charge the battery attached to the car adapter/charger (optional)

1. Connect the car adapter/charger to the car's cigarette lighter socket. The power indicator lights.
2. Attach the battery to the car adapter/charger. The charge indicator lights and charging starts. The indicator turns off when charging is finished.

NOTES:

- When the car adapter/charger is connected to the camera/recorder via the external power adapter, set the OPERATE switch of the camera/recorder to "OFF". Charging is not done when it is set to "CAM" or "VIDEO".
- When fully charged, the battery should provide about 50~60 minutes of operating time (depending on how much you use zoom and pause).
- Read the instruction manual of the car adapter/charger carefully before charging.

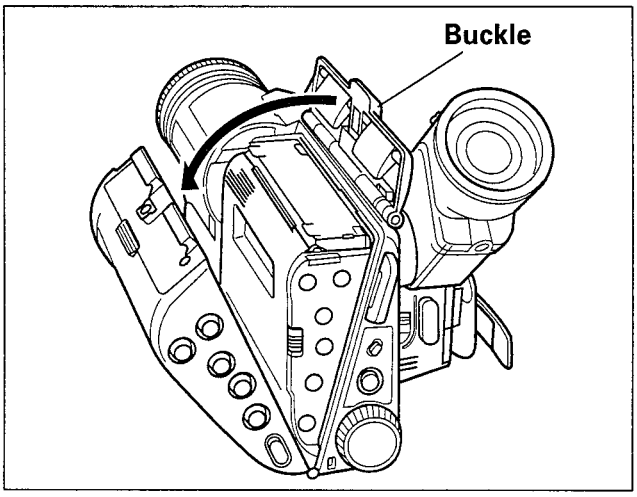


INSERTION AND REMOVAL OF CASSETTES

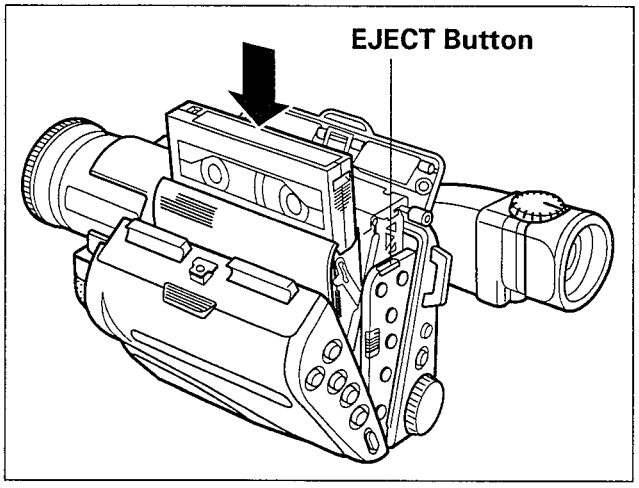
Before inserting or removing a cassette, be sure to connect the power source. When a power source is connected, the cassette can be ejected and removed whether the power is on or off.

■ Insertion

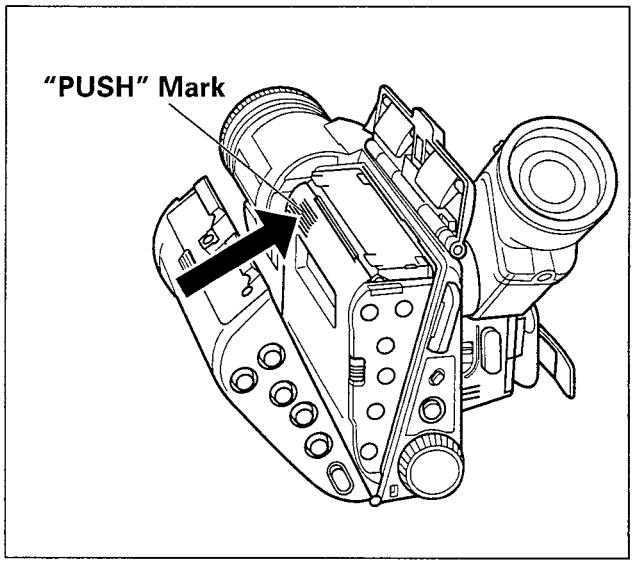
1. Open the case.
   Refer to "WATER-RESISTANT" on page 8.



2. Press the EJECT button.
   The cassette holder will rise and the cassette door will open.
3. Insert a cassette so the transparent window is toward you and the arrow toward the cassette holder. Slide the cassette into cassette holder as far as it will go.



4. Press the cassette holder.
   Press the section of the holder marked "PUSH" until a click is heard.
   The cassette holder will go down automatically. Do not push the holder down, or you may damage your camera/recorder.
   NOTE: The cassette holder will temporarily stop in the middle when it goes down to the regular closed position.This is to detect moisture and does not indicate a fault.



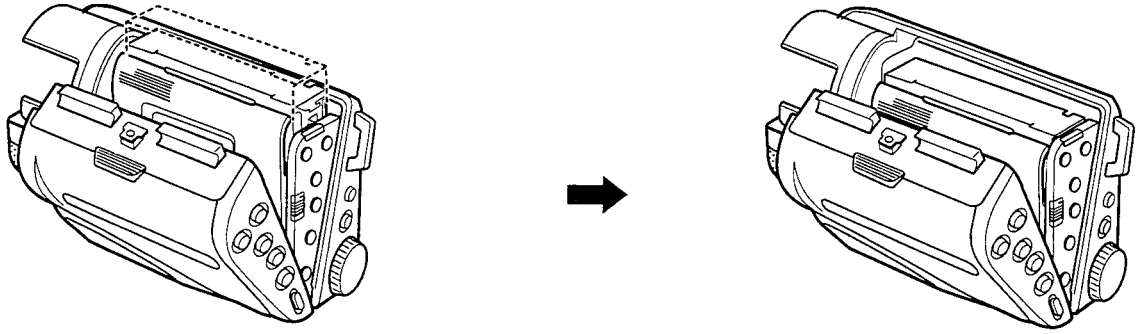
NOTE: If "TAPE" flashes in the viewfinder, remove the cassette and check that the tape is not damaged, is not slack or no dust adheres to it, etc. After making sure that there is no abnormality, reinsert the cassette. If "TAPE" reappears, see "TROUBLESHOOTING" on page 45.

■ Removal

Press the EJECT button and remove the cassette.

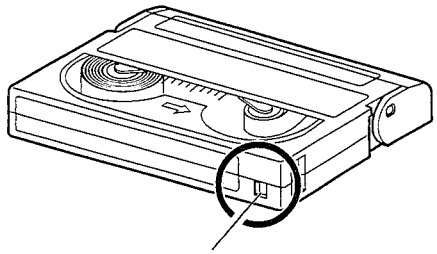
■ When the cassette holder marked "PUSH" is pressed:

If the cassette is in the camera/recorder, the holder stops temporarily to detect moisture.



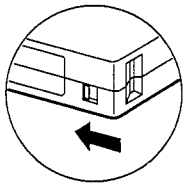
During detection of moisture

8mm Video Cassette
An 8mm Video Cassette has a record-protect tab on the side of the cassette that can be slid to prevent accidental erasure of recorded material.

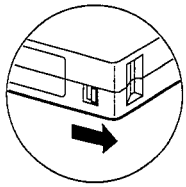


Record-Protect Tab

To prevent accidental erasure, slide the record-protect tab in the direction of the arrow until the tab is completely visible.

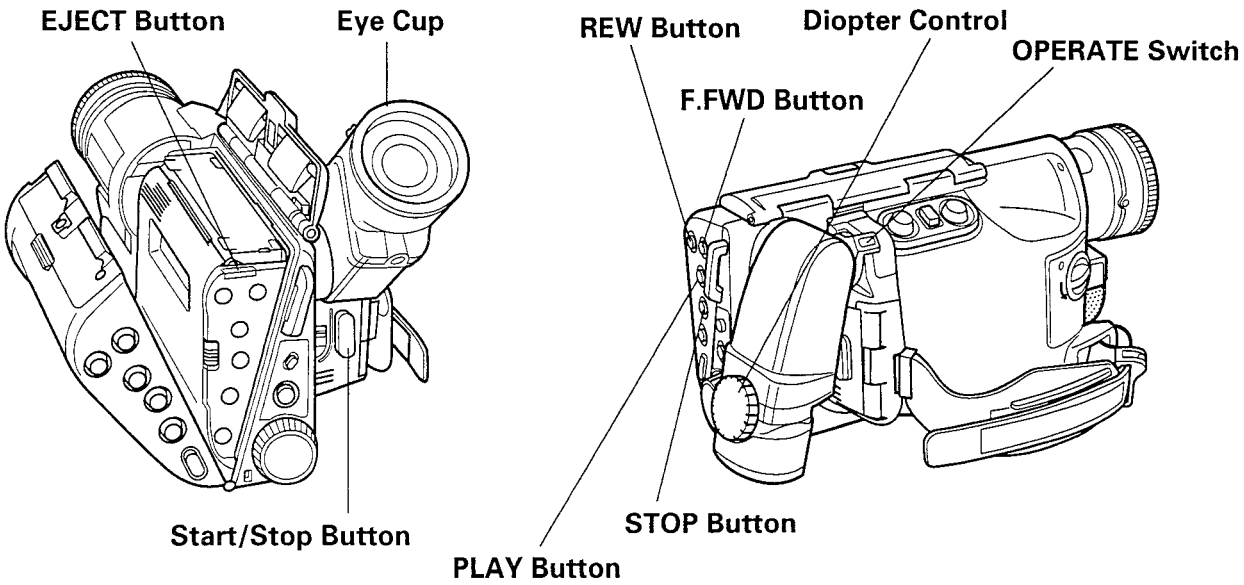


To record on the cassette again, slide the record-protect tab in the direction of the arrow. The tab will disappear behind the cassette case.



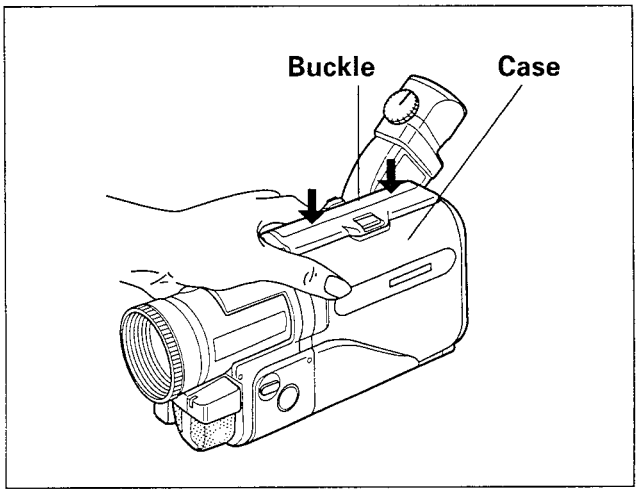
NOTE: After unpacking, it is recommended to fast forward tape to its middle and then rewind it before recording with the camera for the first time.

CAMERA RECORDING



1. Open the case.
   Refer to "WATER-RESISTANT" on page 8.
2. Connect either one of the "POWER SOURCES" on pages 16 and 17.
3. Set the record mode select switch to "START/STOP". Refer to "Holding button to record" on page 23 for the "HOLD TO REC" position.
4. Press EJECT button and insert the cassette.

   NOTE: If the power source is not connected to camera/recorder, the cassette holder will not open.
5. Press the cassette holder.
6. Hold the left and right of the case tightly and lock the buckle securely.

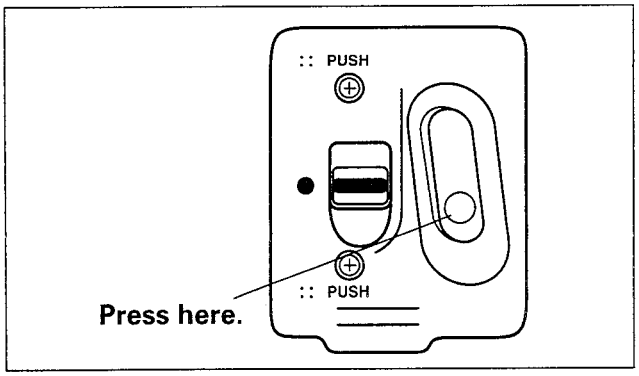


7. Slide OPERATE switch to "CAM". "II" appears and the camera/recorder will enter record/pause mode automatically.

   NOTE: If the record-protect tab on the cassette is closed, the "TAPE" indication in the viewfinder flashes for several seconds and the camera/recorder will not enter record/pause mode.

8. Adjust the diopter control so the display in the viewfinder can be seen most clearly.
9. Now, press Start/Stop button to start shooting the picture. You are now recording the picture you see through the viewfinder. The "REC" indication appears in the viewfinder instead of "II".

   NOTE: Press the projection on the Start/Stop button to engage the button.



10. Press Start/Stop button to stop recording. The "II" indication appears in the viewfinder instead of "REC" in the record/ pause (stand-by) mode. Press the button again to resume recording.

    NOTES:
    - The "TAPE END" indication in the viewfinder starts flashing when there is about three minutes recording time left on the cassette.

- If the record/pause mode continues for more than 5 minutes, the camera/recorder's power is automatically turned off. To turn on again, press Start/Stop button. The camera/recorder enters record/pause (stand-by) mode.

11. After recording, slide OPERATE switch to "VIDEO", and the camera/recorder will be now in the stop mode.
12. Press REW button. The tape will be rewound to the beginning.
13. Press PLAY button. The picture you just recorded will be seen through the viewfinder.

    NOTE: If you connect the camera/recorder to your TV, you can see the picture played back on your TV. Refer to "CONNECTIONS AND OPERATIONS FOR VIEWING THE PICTURE PLAYED BACK ON YOUR TV" on page 36.

14. After playing, press STOP button.
15. Slide OPERATE switch to "OFF" and then slide EJECT switch to remove cassette.
16. Always remove the power source from the camera/recorder after use.

    NOTE: Do not leave the battery in the camera/recorder as the battery power decreases. Be sure to remove it.

NOTE: If you have a cassette tape that has already been partially recorded on and you want to record the remaining blank section, see "QUICK EDIT" on page 38.

■ Holding button to record

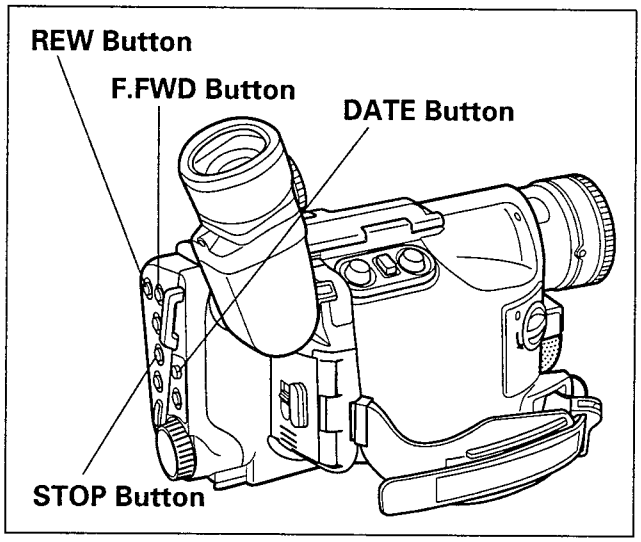
1. Set the record mode select switch to "HOLD TO REC" before starting recording.
2. Press the Start/Stop button and hold it. The camera/recorder records while the Start/Stop button is held depressed and enters the record pause mode when the button is released.

NOTES:
- Switch the record mode in modes other than recording.

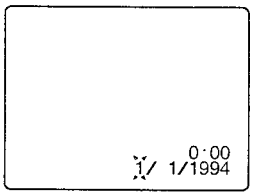
- If the record/pause mode continues for more than 5 minutes, the camera/recorder's power is automatically turned off. To turn on again, press Start/Stop button. The camera/recorder enters record/pause (stand-by) mode.

DATE/TIME SETTING

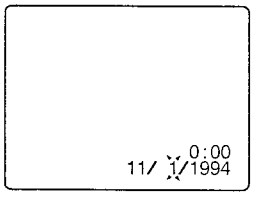
The date and time can be recorded on your tapes to act as a handy reference when viewing them at a later time. Use the following procedure to set up this display for the current date and time.
The time backup battery is rechargeable. Charge the backup battery every two months. Set the OPERATE switch to "OFF" and connect a charged battery or AC adapter/charger to the camera/recorder for 24 hours. Make sure that the current time is displayed correctly before you start recording.
NOTE: The backup battery should be charged every two months. If it is not charged periodically, it will be over-discharged and its life will be shortened.



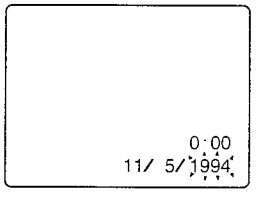
1. Slide the OPERATE switch to "CAM" while holding the small red button in the OPERATE switch down.
2. Press DATE button.
   "0:00" and "1/1/94" appears in the viewfinder and "1" flashes.



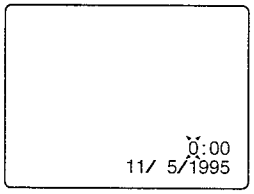
3. Press F.FWD button to select correct date. Hold button down to advance rapidly. If you go past the date you want to set, press REW button. When the correct date appears, press STOP button.



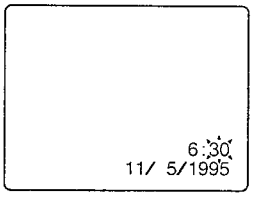
4. Press F.FWD button to select correct month. Hold button down to advance rapidly. If you go past the month you want to set, press REW button. When the correct month appears, press STOP button.



5. Press F.FWD or REW button to select year, and then press STOP button.



6. Press F.FWD or REW button to select correct hour, and then press STOP button.
7. Press F.FWD or REW button to select correct minute.



8. After setting to the correct minute, press DATE button to change the display and start the internal clock.
   It is recommended that you press DATE button to match the time signal.

■ To correct date/time after starting the date/time

1. Press and hold DATE button, and then press STOP button. The date starts flashing.
2. Correct the incorrect digit by using F.FWD, REW and STOP buttons.

■ To correct date/time during programming

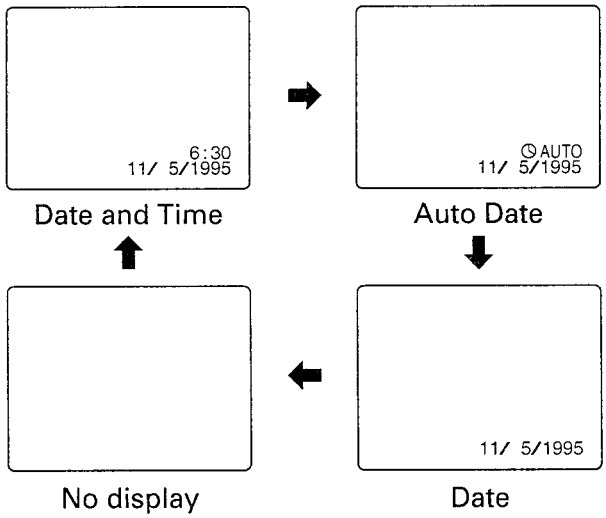
1. Press STOP button repeatedly until the digit that is incorrect flashes.
2. Correct the incorrect digit by using F.FWD, REW and STOP buttons.

■ To record date/time graphics

Press DATE button repeatedly to select the required date/time graphics in the viewfinder, then start recording.

- The display changes in the following order each time DATE button is pressed.

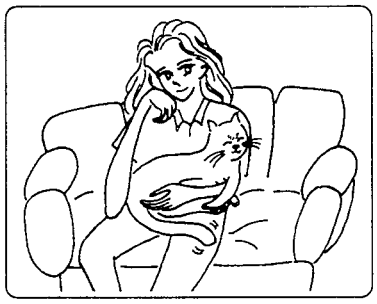
NOTE: Refer to "AUTOMATIC DATE RECORDING" on page 29 for recording the date only once a day.



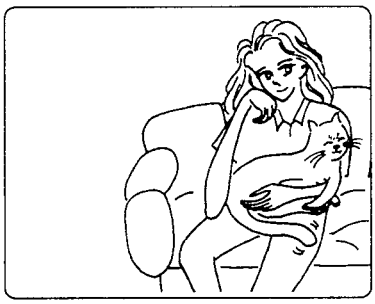
AUTO FOCUS

- You can always focus the object automatically if "FOCUS" is not displayed in the viewfinder.

- **The object at the center of the viewfinder is in focus.**



Good

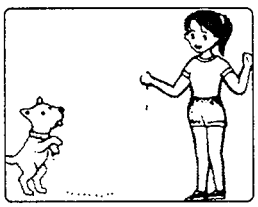


No good

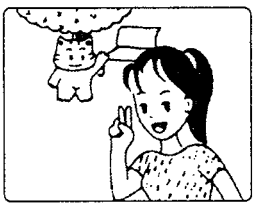
The range of object with which auto focus can be used

- On "T" side : about 1.1m from the lens surface to infinity.
- On "W" side : about 3cm from the lens surface to infinity.

■ You cannot focus automatically with the following objects. Focus manually.

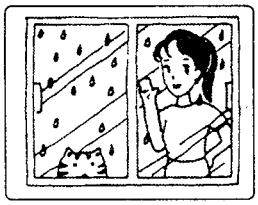


1. Objects not in the center of the viewfinder.



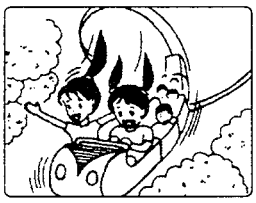
2. Objects at far and near positions at the same time.

3. Objects lit by a spotlight or neon signs, etc.

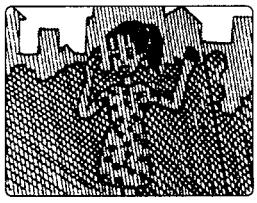


4. Objects behind glass with water droplets or dust on it.

5. Objects with almost no difference in brightness such as a white wall.



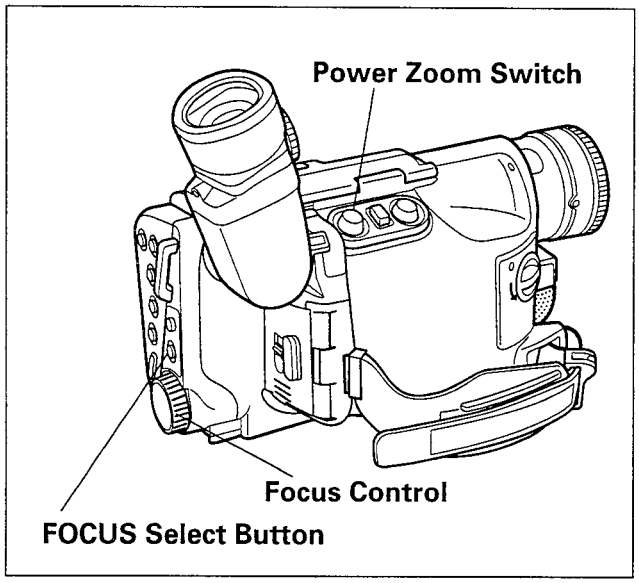
6. Objects moving rapidly.



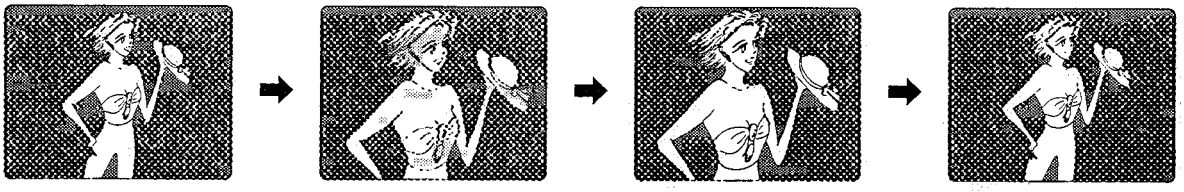
7. Dark objects

■ MANUAL FOCUSING

1. Press the FOCUS select button to display "FOCUS" in the viewdinder.
   - When "FOCUS" is displayed in the viewfinder, you can adjust the focus manually.
   - When the FOCUS select button is pressed again, "FOCUS" disappears from the viewfinder and the camera returns to the auto focus mode.
2. Zoom in on the object by pressing the power zoom switch on the "T" side.
3. Turn the Focus control to bring the subject into focus.
   NOTE: If focusing is performed without zooming up first, the picture may become out of focus when the zoom-up is done during actual picture taking.
4. Then, zoom back the object as desired.



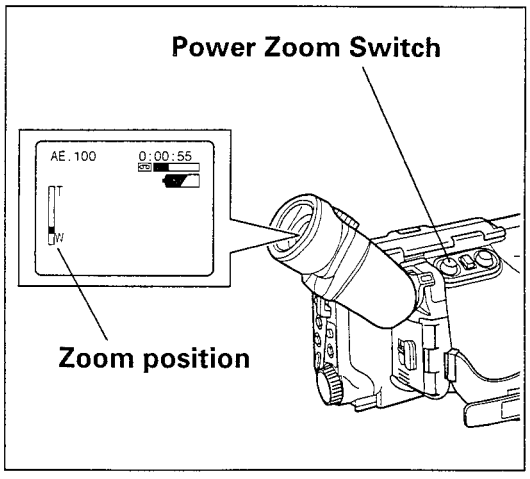
NOTE: After using the manual focus, press the FOCUS select button to switch off "FOCUS" in the viewfinder.



POWER ZOOM

- Press power zoom switch on the "W" side, and the picture gradually widens.

- Press the power zoom switch on the "T" side, and the picture gradually becomes telescopic.

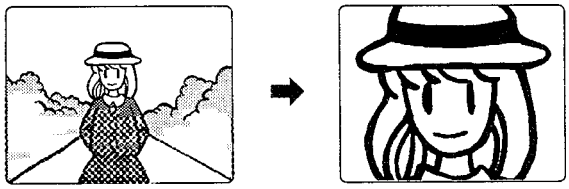


NOTES:

- If "ZOOM" appears in the viewfinder, the digital zoom function is engaged.
- When the power zoom switch is operated, the zoom position is displayed in the viewfinder for about 5 seconds and then disappears. The zoom position is displayed in 10 steps.
- Pressing the power zoom switch strongly results in rapid zooming and pressing it lightly results in slow zooming.
- You can use the zoom switch on the remote control though it provides only low-speed zooming; it cannot change the zoom speed.

DIGITAL ZOOM

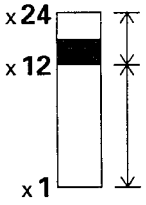
This feature allows you to increase the magnification of the image at the center of the screen up to 2 times greater than the extreme telephoto position.



Press the "T" side of the power zoom switch and hold it ; "ZOOM" appears in the viewfinder and the digital zoom function is engaged.

NOTE: The digital zoom functions from the extremely telephoto position of X12.

- **Zoom area**

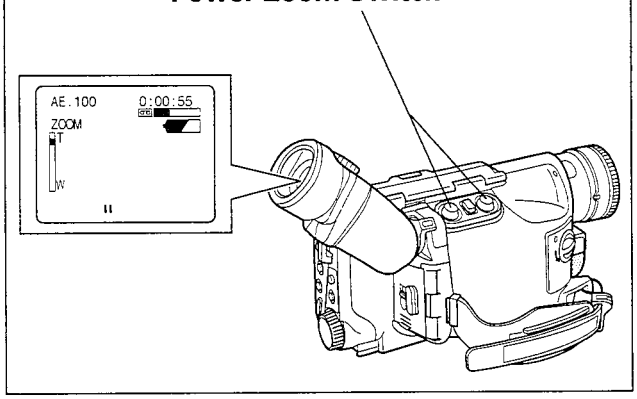


Digital zoom ("ZOOM" appears)

Optical zoom

You can control the digital enlargement ratio by pressing the "T" or "W" side of the power zoom switch. When "ZOOM" is not displayed in the viewfinder, the normal zooming function is restored.

Power Zoom Switch



BEFORE YOU START TAKING PICTURES WITH YOUR DIGITAL ZOOM CAMERA/ RECORDER

Digital zoom lets you really get close to the action. Due to the unique nature of this feature here are some important points to consider before you start:

As with all digital zoom camera/recorders picture clarity diminishes at high zoom ratios.

When you zoom in on your subject, at some point camera shake will become noticeable. As the zoom ratio becomes high, it is better to use a tripod.

Since no two people will use their camera/recorders in exactly the same way, you should test the digital zoom feature by making a brief test tape at various zoom settings. So get comfortable with your new camera/recorder then go out and get close to the action.

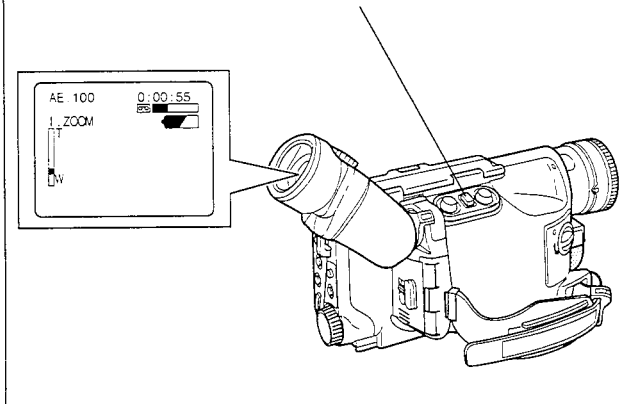
INSTANT ZOOM

The instant zoom feature activates the digital zoom to magnify the subject being recorded 1.5 times momentarily regardless of the zooming engaged by the power zoom switch.

Press the INST. ZOOM button. "I.ZOOM" appears in the viewfinder and the subject is magnified 1.5 times. The instant zoom function only operates when "I.ZOOM" is displayed. To release instant zoom, press the INST. ZOOM button again so that "I.ZOOM" disappears from the viewfinder.

NOTE: When the instant zoom is used, the more the image is magnified, the rougher the picture becomes. Also even a slight shaking of the camera/recorder is conspicuous.

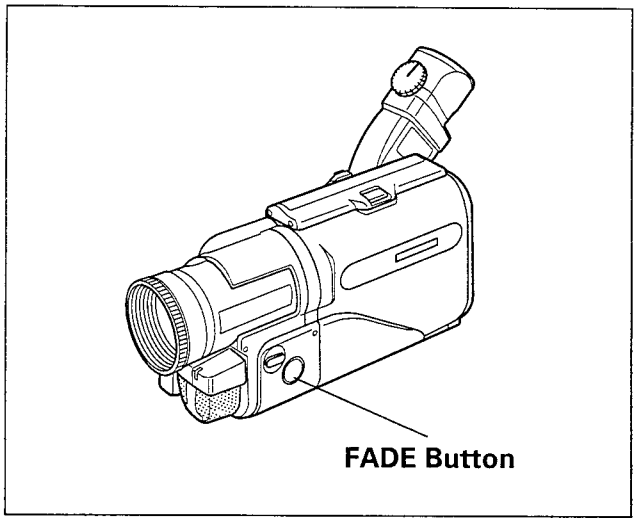
INST. ZOOM Button



FADE-IN/FADE-OUT

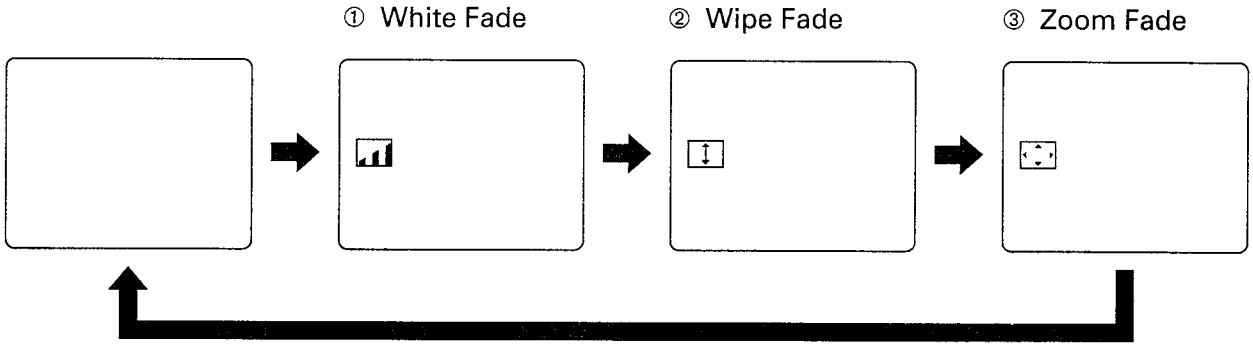
This feature lets you add a professional touch to your home recordings. When you fade into a scene, the recording will start with a blank scene and the picture will gradually appear. The picture gradually disappears when fading out. There are three fade modes.

NOTE: When using FADE button, both picture and sound will gradually appear and disappear. The fade speed is automatically controlled by the camera/recorder.

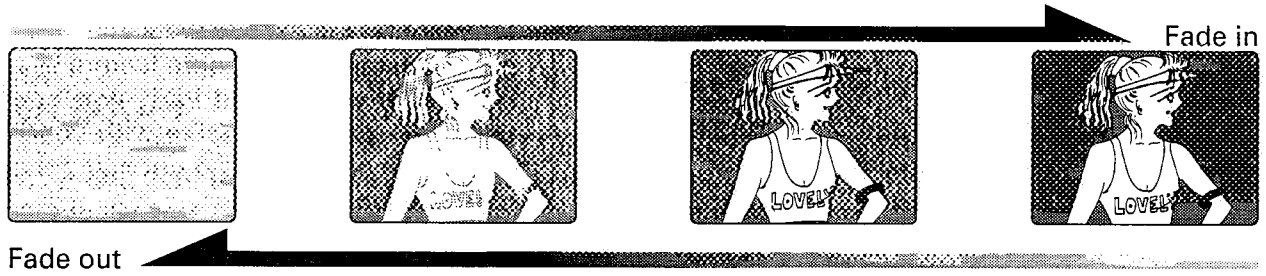


■ To select the fade mode

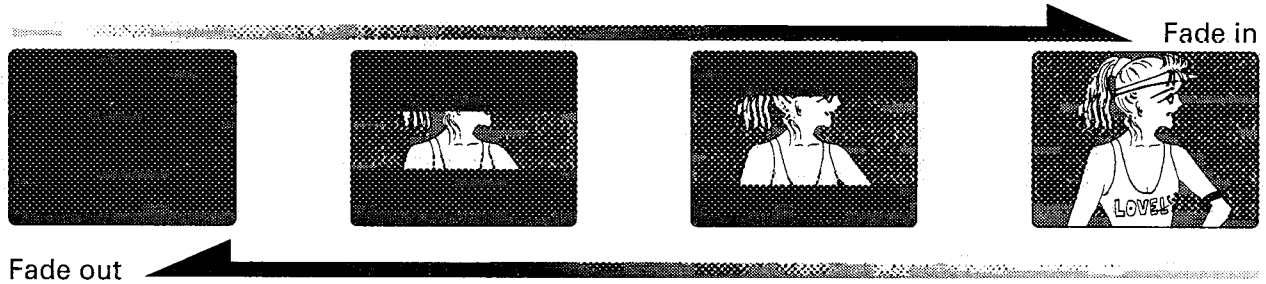
Each time the button is pressed, the FADE mode is switched and displayed in the viewfinder. The last mode selected will appear first.



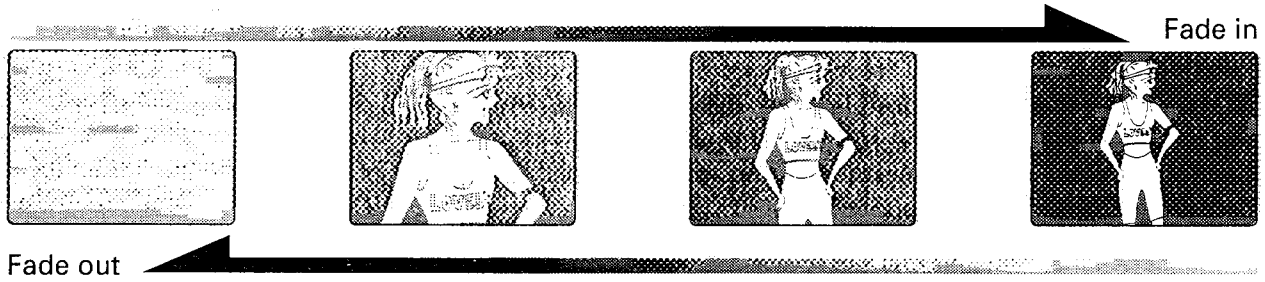
① White Fade (fading in/out, from/to a white picture)



② Wipe Fade (fading in/out, from/to a black picture)



③ Zoom Fade (fading in/out while zooming)



■ FADE-IN

1. Press the FADE button before recording to select the fade mode.
2. Press the Start/Stop button to start recording.
   - The picture fades in automatically and recording starts.

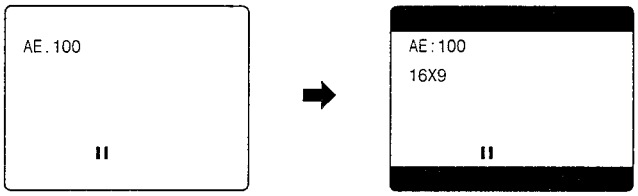
■ FADE-OUT

1. While the camera/recorder is recording, press the FADE button to select the fade mode.
2. Press the Start/Stop button to stop recording.
   - The picture fades out automatically and "REC" flashes until the fade ends then recording stops.

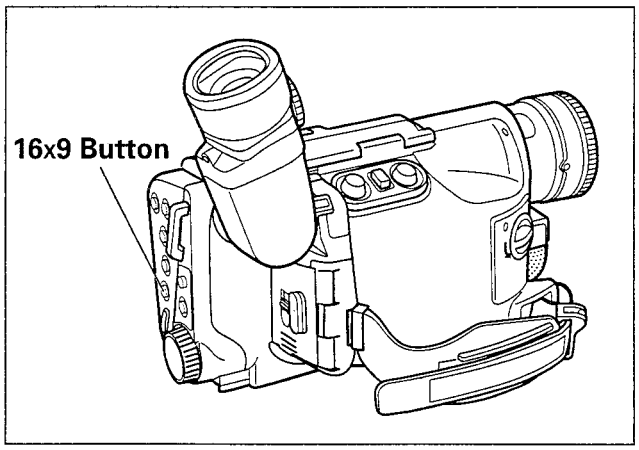
NOTE: When fading out be sure to wait until the PAUSE indicator (II) is visible in the viewfinder before attempting to put the camera/recorder into the record mode again.

16x9 MODE

Pressing the 16x9 button during recording or recording pause fades the top and bottom of the picture in the viewfinder to black.



- "16x9" is displayed in the viewfinder.
- When the 16x9 button is pressed again, "16x9" disappears and the normal picture is restored.



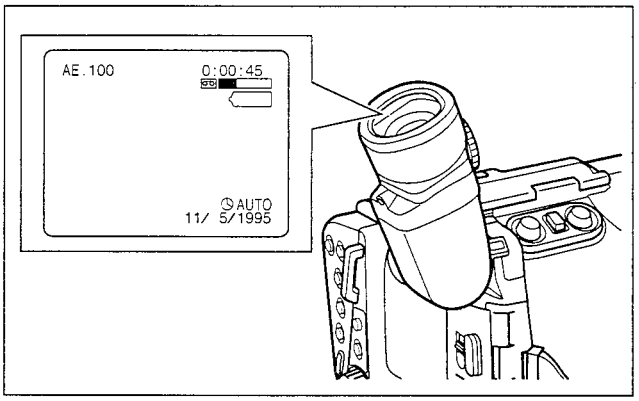
AUTOMATIC DATE RECORDING

This feature records the date automatically once a day. After you begin recording, the date is recorded automatically for 10 seconds. The same date is recorded again in the following cases.

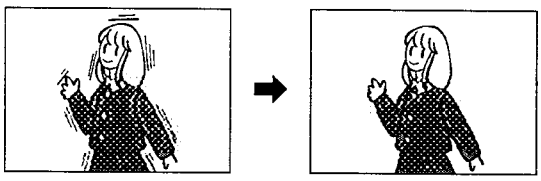
- When the cassette is replaced
- When "◷ AUTO" is displayed again after being switched to the date display
- When the recording is for less than 10 seconds

If the date changes while recording continues over 10 seconds, the date is recorded for 10 seconds when recording is restarted after the camera/recorder has been set to the standby mode.

Press the DATE button until "◷ AUTO" and the date appear in the viewfinder before you begin to record. The date will be recorded whenever it appears in the viewfinder.



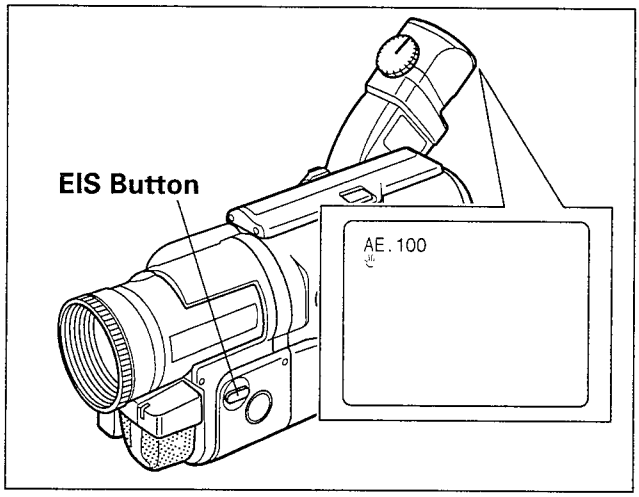
ELECTRONIC IMAGE STABILIZER (EIS)



This function corrects slight shaking of the image in the following record modes.

- Recording by zooming up to a distant subject
- Recording by approaching a small subject
- Recording while walking around
- Recording a subject behind the window of a vehicle

1. Press the EIS button to engage the electronic image stabilizer and to display the EIS indicator " ((✋)) ".
   - Press the button again to switch off this function.
2. Press the start/stop button to start recording.
   - EIS corrects slight shaking of the image when " ((✋)) " is displayed.



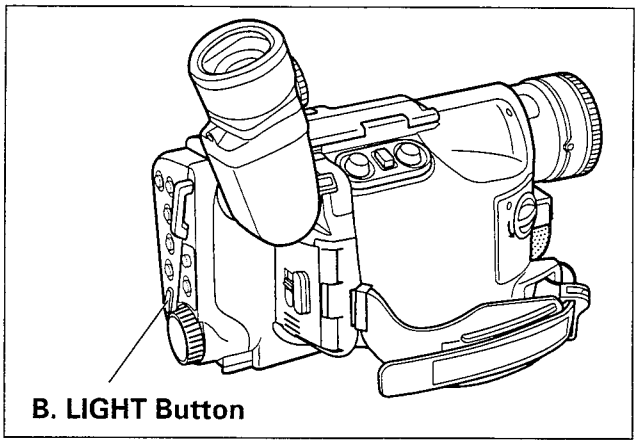
NOTES:

- Shaking of the image appears in the viewfinder with a slight delay.
- EIS may not operate correctly when a wide or teleconverter lens is used.
- When the EIS function is engaged in the vicinity of the zoom range with "ZOOM" displayed in the viewfinder and the zoom is moved from the wide-angle end, the image size will change, but this is normal.
- When the EIS function is engaged, the picture becomes rough.
- When the EIS function is engaged, the angle of view at the wide-angle end becomes narrower.

EXPOSURE CORRECTION

This camera/recorder is provided with an auto iris mechanism which automatically adjusts the lens aperture in accordance with the incident light. When the object is dark, the iris opens automatically, and it closes when the object is bright. When the power is switched off, the iris is automatically set to the fully closed position.

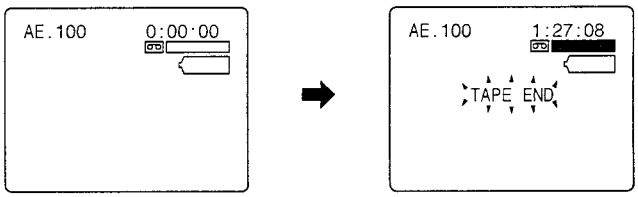
When the background is brightly lit and the subject appears too dark, press and hold down B. LIGHT button during recording. While you hold the button depressed, you can correct the back light.



REMAINING TAPE

The tape remaining display shows the remaining tape that can be used for recording and playback in the viewfinder using bars.

Insert a cassette into the camera/recorder; "[cassette] – – – – – –" appears in the viewfinder. 10 seconds after recording or playback is started, the remaining tape will be displayed. The display will appear when a cassette is loaded, and it will disappear when the cassette is ejected.

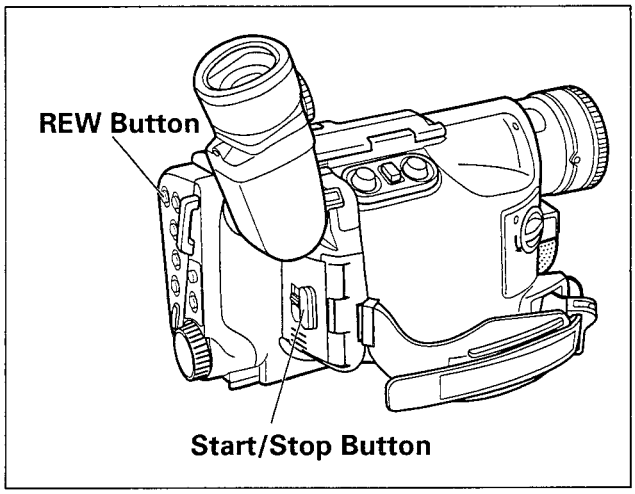


NOTES:

- The maximum tape remaining is displayed by the 7 bars as shown on the right regardless of the recording time of the cassette being used. The ramaining tape per bar is different for different cassettes.
- The tape remaining display appears 10 seconds after the tape starts to run.
- The "TAPE END" indication in the viewfinder starts flashing when there is about three minutes recording time left on the cassette.

INSTANT REVIEW

1. In record/pause (stand by) mode, tap REW button, and the recorded scene of the last few seconds is played back in the reverse direction and then played back in the forward direction.
2. When the tape reaches the end of the scene you have just recorded, the camera/recorder returns to the record/pause (stand by) mode. Recording starts again when the Start/Stop button is pressed again.

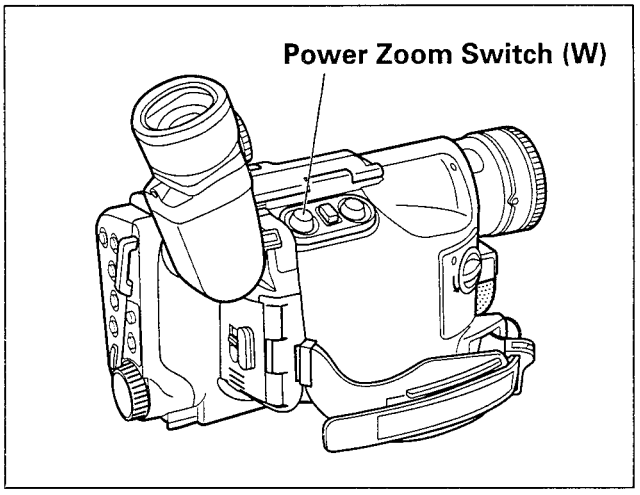


MACRO

It permits you to shoot objects as close as 3cm from the lens tip.
Press and hold "W" side of power zoom switch. An object is auto focused.

NOTES:

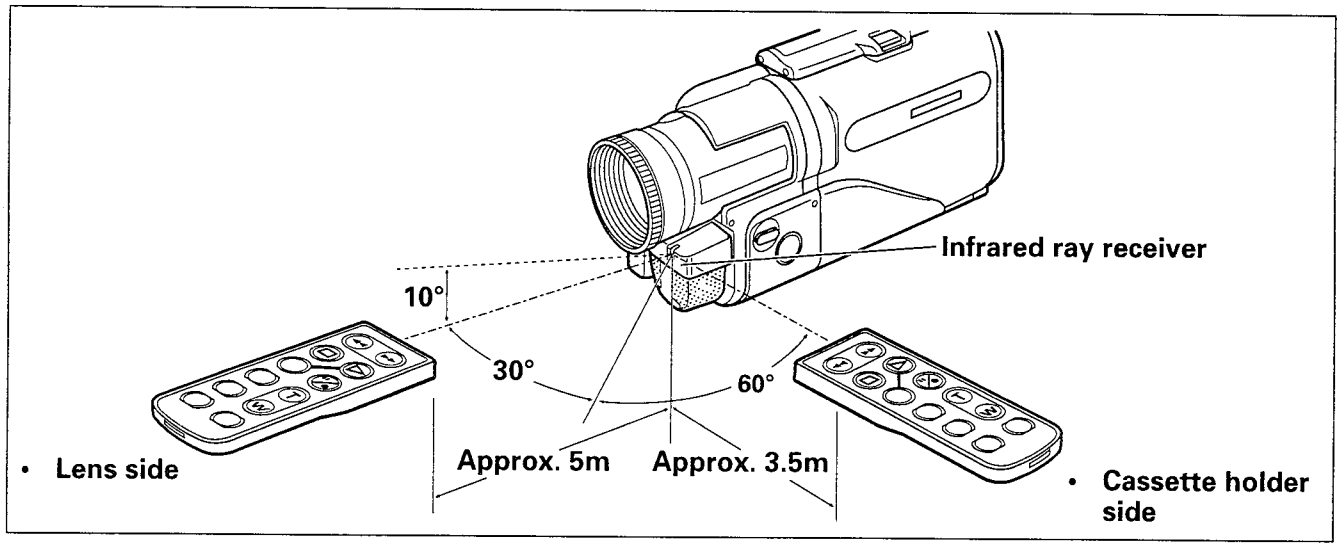
- Determine the size of the object by moving the camera backward and forward.
- Be careful as the lighting tends to be low when shooting in the above conditions.
- A subject 1.1m from the lens surface to infinity can be focused on the telephoto side.



WIRELESS REMOTE CONTROL

You can operate the camera/recorder with the wireless remote control (provided) from a distance. The buttons on the remote control except for AV DUB, DISPLAY, COUNTER RESET, TITLE ON/OFF and S.EDIT have the same functions as the buttons with the same identifications on the camera/recorder. Aim the remote control at the receiver of the camera/recorder.

■ **Remote controllable range**

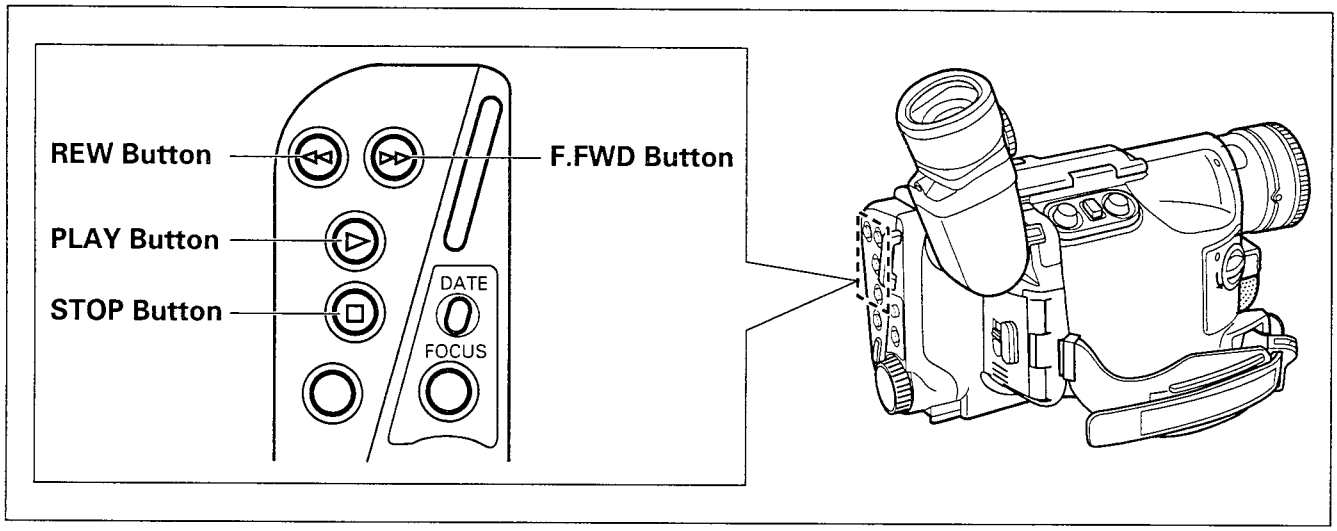


Cautions on the remote control

- Use the remote control indoors. When the infrared ray receiver is exposed to direct sunlight or strong light such as that from artificial lighting, the remote control may not operate correctly.
- The remote control cannot be operated if there is an obstacle between the remote control and infrared ray receiver.
- The remote control code of this camera/recorder is "VCR2". If the remote control code of your VCR is the same, "VCR2", your VCR may malfunction when this remote control is used.

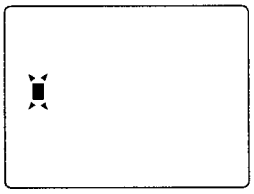
TITLE RECORDING

You can easily create and record personalized titles on your videos with the camera/recorder's built-in titler.
The titler will store 2 different title pages in memory. Once a title is stored, it can be displayed and recorded at anytime. Each title page can contain two lines of 16 characters each.
The character contains 47 different characters for creating titles.

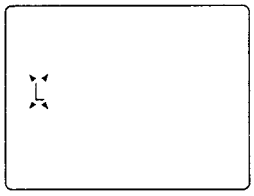


■ Creating a title

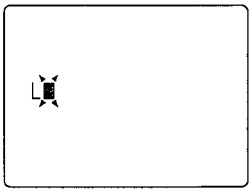
1. Press TITLE ON/OFF button on the remote control. The flashing cursor will appear in the viewfinder.



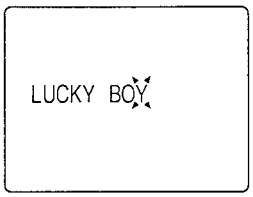
2. Press STOP button repeatedly to move the flashing cursor to the place you want to begin your title.
3. Select the first character for your title by pressing the REW or F.FWD button repeatedly until the desired character appears.
   NOTE: Each title can contain up to two lines of 16 characters each. A chart showing the characters contained in the registers is located on the right.



4. After you have selected the first character, press STOP button to move the flashing cursor to the place you want the next character.



5. Repeat steps 3 and 4 until you have completed the title.



   NOTE: Character may flash, however it will be recorded correctly without flashing.
6. After completing your title, press PLAY button and create the title on another title page as required.
7. After creating the title, press TITLE ON/OFF button on the remote control to remove the title graphics from the viewfinder. Now title graphics is stored in memory.
   NOTE: As long as the correct current time can be displayed, the title is held in memory.

■ Correcting errors during programming

1. Press STOP button repeatedly until the character to be corrected flashes.
2. Press either REW or F.FWD button until the correct character appears.

NOTE: The corrected character may flash, however it will be recorded correctly without flashing.

■ Recording titles on a tape in the camera/ recorder

1. Slide OPERATE switch to "VIDEO".
2. Locate the position on the tape that you wish to record the title.
3. Slide OPERATE switch to "CAM".
4. Press TITLE ON/OFF button on the remote control to display the title graphics.
5. Press PLAY button until the title you wish to record appears in the viewfinder.
6. Press Start/Stop button to start the title recording.
7. Press TITLE ON/OFF button on the remote control to remove the title graphics from the viewfinder.
   The camera/recorder will now record as normal.

■ Recording titles on another VCR while playing a tape back with the camera/ recorder

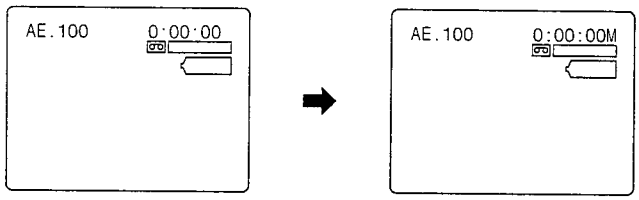
1. Connect the camera/recorder and VCR.
   (See page 39.)
2. Select the title you wish to record from page 1 or page 2. The last title selected will appear first. Press TITLE ON/OFF button on the remote control to turn title off.
3. Set the VCR in the recording mode and camera/ recorder in the playback mode.
4. Press TITLE ON/OFF button on the remote control when you see the scene where you want to record the title.
5. Press TITLE ON/OFF button on the remote control to erase the display from the viewfinder.

■ Chart of characters available by using the CHARACTER control

A B C D E F G H I J K L M N O P Q R
S T U V W X Y Z 0 1 2 3 4 5 6 7 8 9
? ' . / , - ; : < > !

DISPLAY BUTTON

When the DISPLAY button on the remote control is pressed, the displays in the viewfinder will change as follows.



Linear time counter

(cannot be monitored on the TV)

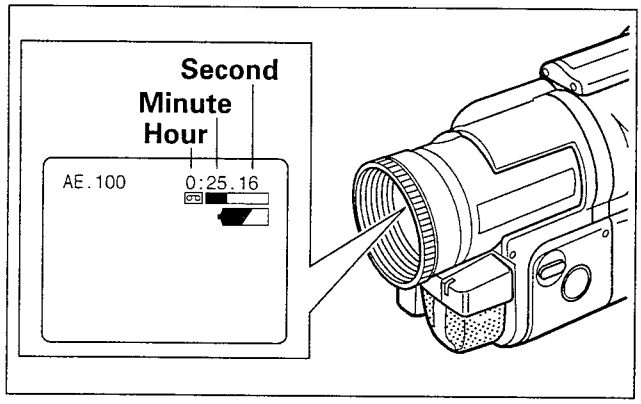
Linear time counter with memory

(can be monitored on the TV)

LINEAR TIME COUNTER

Shows length of tape run in hours, minutes and seconds.
When the camera/recorder is turned on, the linear time counter appears in the viewfinder.
Load a cassette into the camera/recorder and perform recording or playback; the counter indicates the elapsed time. Press the COUNTER RESET button on the remote control to reset the counter to "0:00:00".

NOTE: Counter changes to 0:00:00 when cassette is ejected.

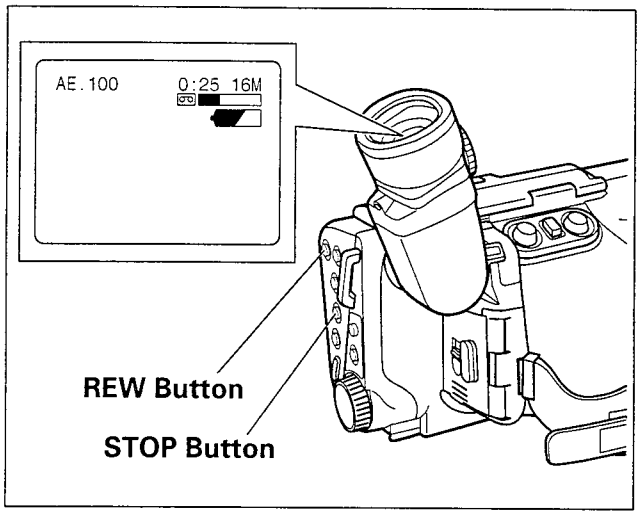


MEMORY

When the linear time counter with memory indication appears in the viewfinder, a tape that is being rewound automatically stops when the counter reads approximately "0:00:00M". This is useful if there is a section of tape you want to review immediately after recording or if you want to return to the same point several times in a row.

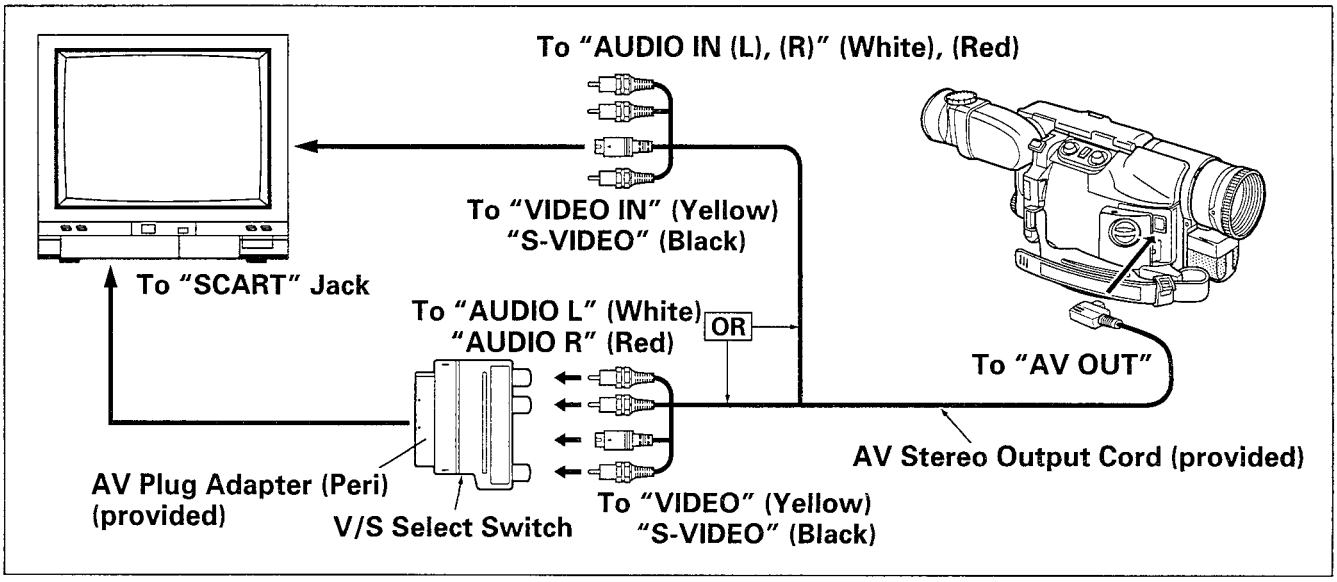
1. Press the DISPLAY button on the remote control so the linear time counter with memory appears.
2. Start playing or recording a tape.
3. At the point you want playback to start, press COUNTER RESET button on the remote control to reset the counter to "0:00:00M".
4. Continue to play or record.
5. Press STOP button.
6. Press REW button. The tape will be rewound to the preselected point, at approximately "0:00:00M" indication.

NOTE: The tape will also stop approximately at "0:00:00M" during fast forward mode.



AUDIO/VIDEO DUBBING

Audio/video dubbing lets you record new audio and video from the camera/recorder's built-in microphone and camera on to the tape in the camera/recorder.



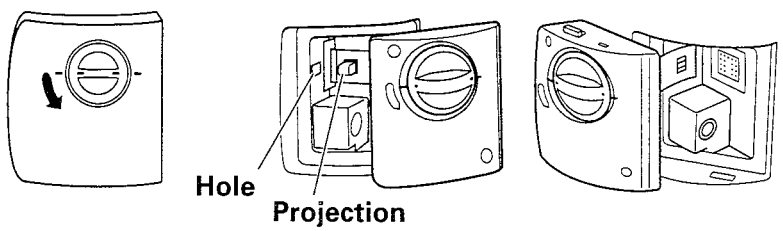
NOTES:
- If your TV has "AUDIO/VIDEO IN", connect the AV stereo output cord directly to the TV.
- If your TV has "SCART" jack, connect the AV stereo output cord to the AV plug adapter, and then connect the adapter to the SCART jack of your TV.
- If you use the AV plug adapter to connect the camera/recorder to a TV which is able to handle S-VIDEO signals, set the V/S select switch on the side of the adapter to "S". Set the switch to "V" for conventional TVs.
- If your TV has a single (mono) audio input, connect either the left or right audio plug to the audio input on the TV.
- When the audio/video dubbed portion is played back, noise may appear at the end of the dubbed portion.
- If the camera/recorder is in AV DUB pause or STILL mode for more than 5 minutes, the camera/recorder stops automatically to protect the tape.
- Automatic date recording is disabled during audio/video dubbing.

1. Insert a recorded tape.
   Be sure that the record-protect tab is not closed.
2. Slide OPERATE switch to "VIDEO".
3. Aim the remote control at the receiver on the camera/recorder.
4. Press PLAY button and then REW or F.FWD button to search to the approximate area on the tape where you want to begin your dub.
5. Press PLAY button again to search for the exact position that you want to stop dubbing and then press PAUSE (START/STOP) button.
6. Press DISPLAY button so that the linear time counter with memory appears and then press COUNTER RESET button to set the counter reading to "0:00:00M".
7. Press REW button to rewind the tape to the approximate position that you want to start dubbing.
8. Press PLAY button, and when the exact position that you start to dub is reached, press PAUSE (START/STOP) button.
9. Press and hold the AV DUB button, and then press the PLAY button."A/V DUB ❚❚" appears in the viewfinder, and at the same time the picture to be dubbed appears.
10. Press PAUSE (START/STOP) button.
    "A/V DUB" will appear in the viewfinder and A/V dubbing will start. A/V dubbing will stop when the counter reads "0:00:00M".

■ How to open the jack cover

① Turn the knob in the direction of the arrow to open the cover.

② Insert the projection on the cover stay into the hole in the case.

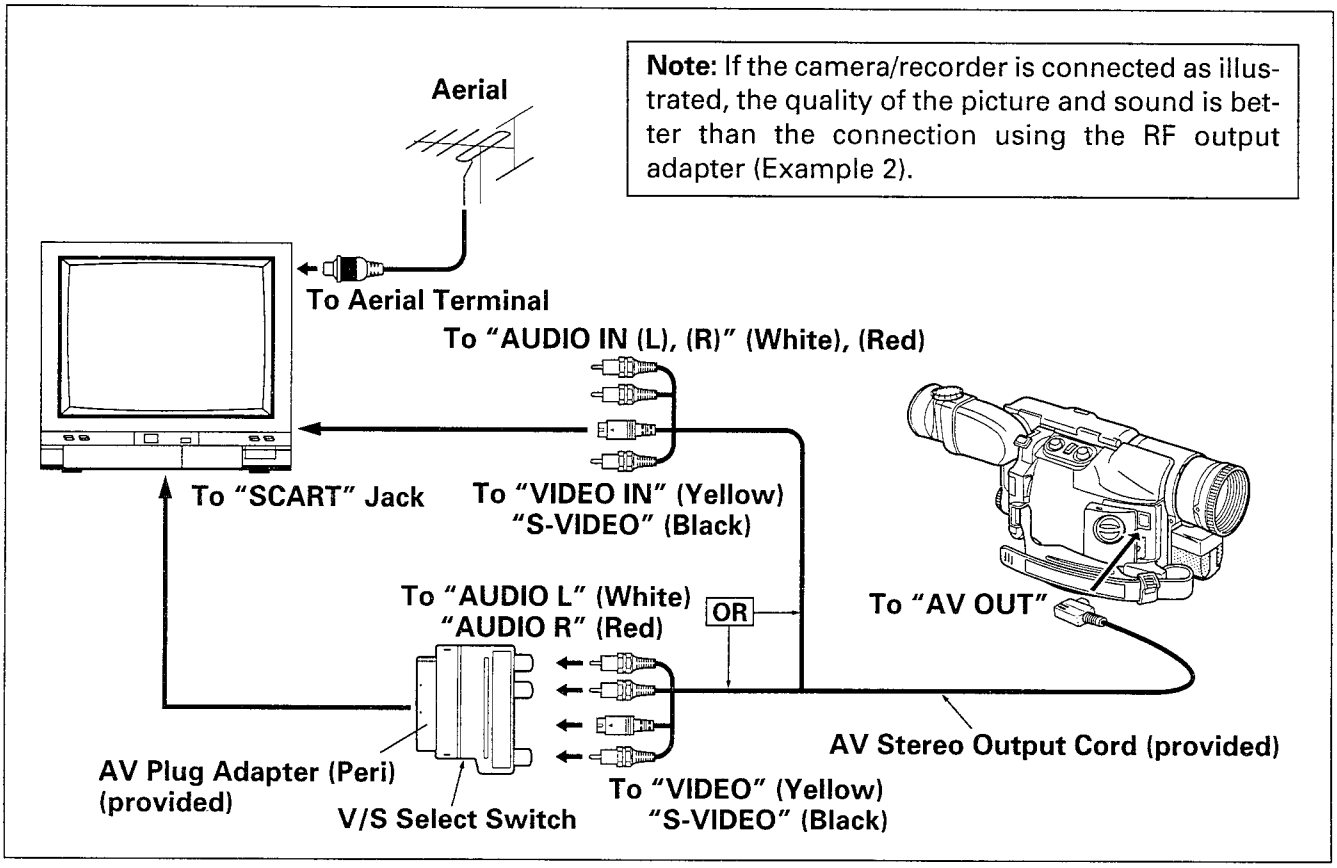


NOTES:
- The plug can easily be inserted and pulled out when the projection on the stay is inserted into the hole.
- Release the projection from the hole to close the jack cover.

CONNECTIONS AND OPERATIONS FOR VIEWING THE PICTURE PLAYED BACK ON YOUR TV

To play back a tape recorded on your camera/recorder and view it on your TV receiver, you must connect the camera/recorder to the TV receiver using either AV stereo output cord or RF output adapter.

Example 1: If your TV has SCART jack or AUDIO/VIDEO IN jacks,


Note: If the camera/recorder is connected as illustrated, the quality of the picture and sound is better than the connection using the RF output adapter (Example 2).
Aerial
To Aerial Terminal
To "AUDIO IN (L), (R)" (White), (Red)
To "SCART" Jack
To "VIDEO IN" (Yellow)
"S-VIDEO" (Black)
To "AUDIO L" (White)
"AUDIO R" (Red)
OR
To "AV OUT"
AV Stereo Output Cord (provided)
AV Plug Adapter (Peri)
(provided)
V/S Select Switch
To "VIDEO" (Yellow)
"S-VIDEO" (Black)

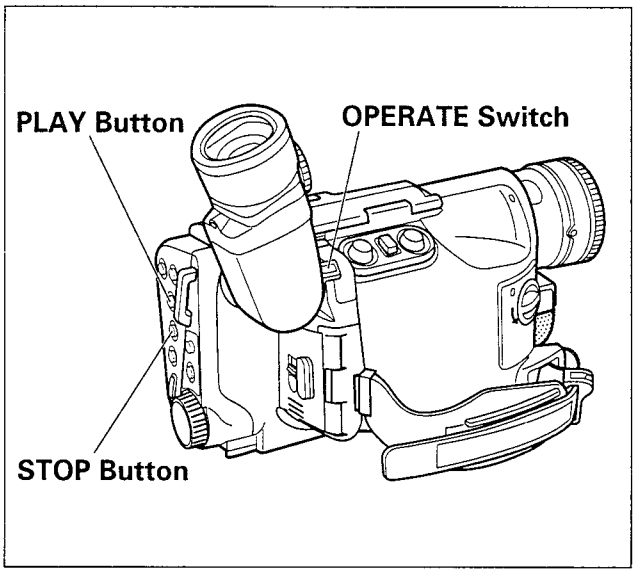
1. Connect the TV and camera/recorder as illustrated above. See page 35 for opening the jack cover of the camera/recorder.

   NOTES:
   - If your TV has a single (mono) audio input, connect either the left or right audio plug to the audio input on the TV.
   - If your TV has an S-VIDEO input, connect the S-VIDEO plug (black) instead of the VIDEO plug (yellow).
   - If you use the AV plug adapter to connect the camera/recorder to a TV which is able to handle S-VIDEO signals, set the V/S select switch on the side of the adapter to "S". Set the switch to "V" for conventional TVs.
2. Turn on TV and select video input.
3. Insert the cassette.
4. Slide OPERATE switch to "VIDEO".
5. Press PLAY button.
6. After playing press STOP button.

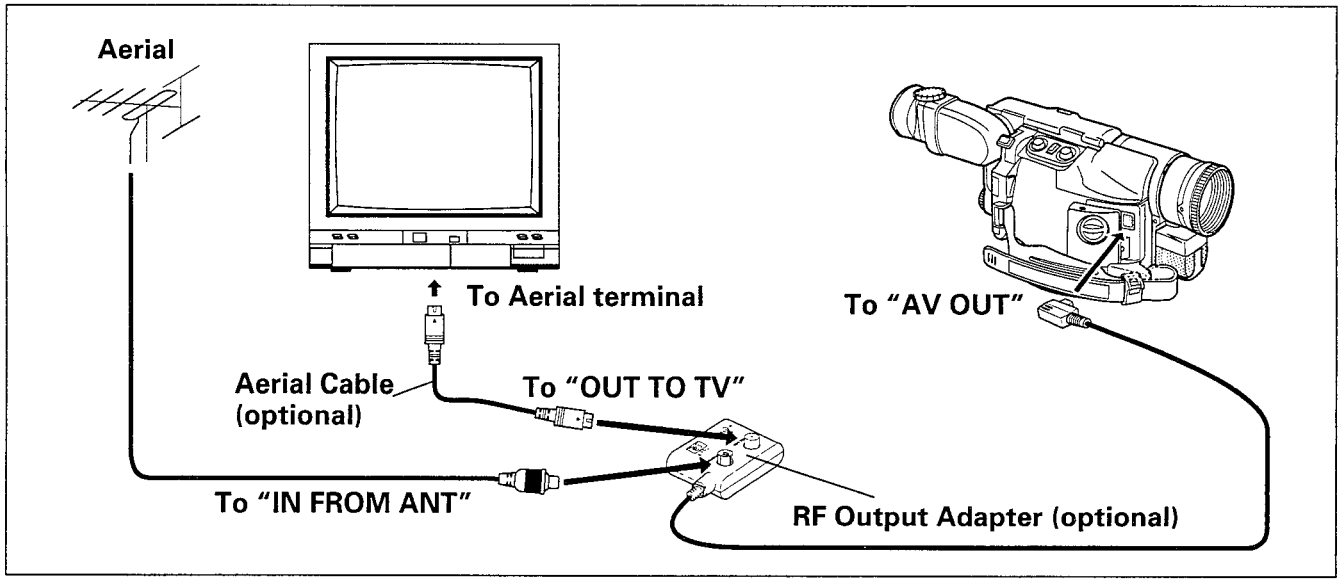
■ S-VIDEO Plug

The black plug of the AV stereo output cord (provided) outputs the video signal by separating it into the luminance (Y) and chrominance (C) signal components. If your TV is able to handle S-VIDEO signals, connecting this plug to the TV gives a picture much clearer than can be obtained from the signal supplied through the conventional video plug.

* The "S" in the S-VIDEO plug stands for a "S"eparate Y/C.



Example 2: If your TV is a regular TV,



1. Remove the antenna cable from your TV set. Connect this cable to "IN FROM ANT" on the RF output adapter.
2. Connect the Aerial cable to "OUT TO TV" on the RF output adapter.
3. Connect the other end to aerial terminal on your TV.
4. Connect the connector cable from RF output adapter to "AV OUT" on the camera/recorder. See page 35 for opening the jack cover of the camera/recorder.
5. Turn on the TV and select an unused channel (CH37). Refer to "VIDEO CHANNEL SETTING" below.
6. Perform same procedures in steps 3 through 6 of "Example 1" on page 36.

NOTE: With this connection, the output sound is monaural.

NOTE: If you want to watch a TV programme with camera/recorder connected as illustrated, slide OPERATE switch of the camera/recorder to off.

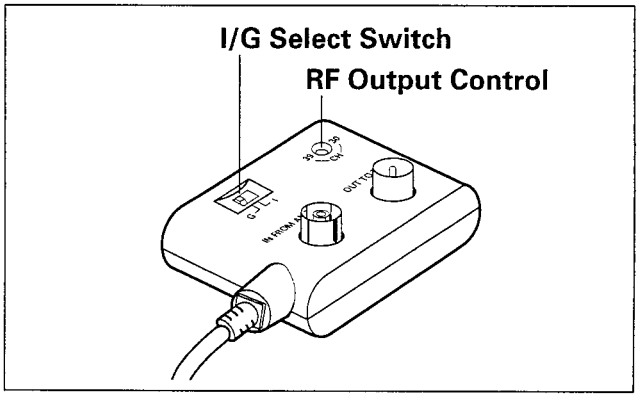
VIDEO CHANNEL SETTING

When viewing the picture played back by the camera/recorder on your TV, change over the I/G select switch of the RF output adapter matching your TV as well as to select the video channel on the TV.

1. Connect TV, RF output adapter and camera/recorder. (See above)
2. Set I/G select switch on RF output adapter as follows.

Colour TV broadcast system in your country	Position of I/G Select Switch
PAL (System I)	I
PAL (System B & G)	G

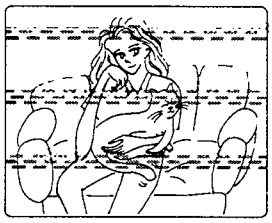
3. Turn on TV and select an unused channel (CH37). (In some cases this may be marked A/V.)
4. Insert the recorded tape to camera/recorder.
5. Slide OPERATE switch to "VIDEO".
6. Press PLAY button of camera/recorder. Now playback picture appears on your TV. If the playback picture is not clear or channel 37 is used for broadcasting in your area, adjust the RF output control of RF output adapter using a small screwdriver and readjust your TV until the playback picture is clearly observed.

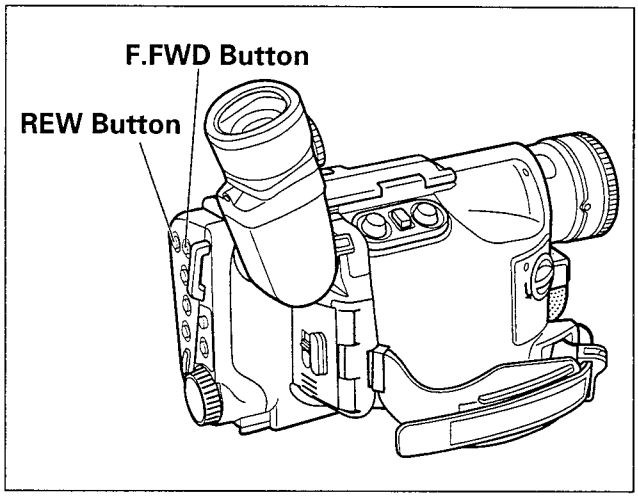


F-SEARCH AND R-SEARCH

When you press F.FWD or REW button during playback, the tape will be played back at a speed about 7 times (forward search) or 5 times (reverse search) faster than the normal playback speed, and you can easily locate a certain spot on the tape.

NOTE: There will be noise (interference) in the F-search or R-search pictures.



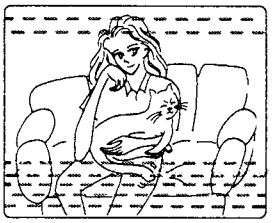


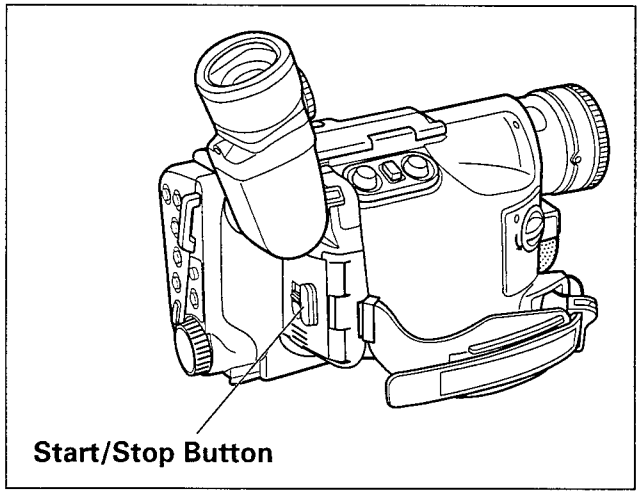
STILL

When Start/Stop button is pressed during playback, a still picture can be seen. To start again press Start/Stop button and playback will be resumed.

NOTES:

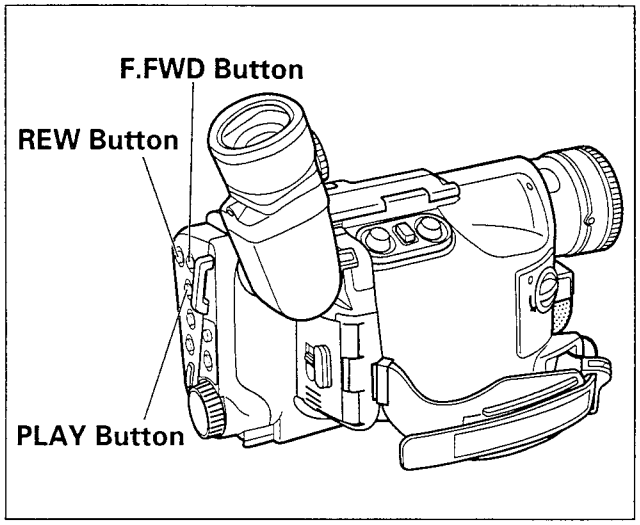
- There will be noise (interference) in the still picture.
- If the play pause mode continues for more than 5 minutes, the camera/recorder will automatically enter the stop mode to protect the tape from damage.



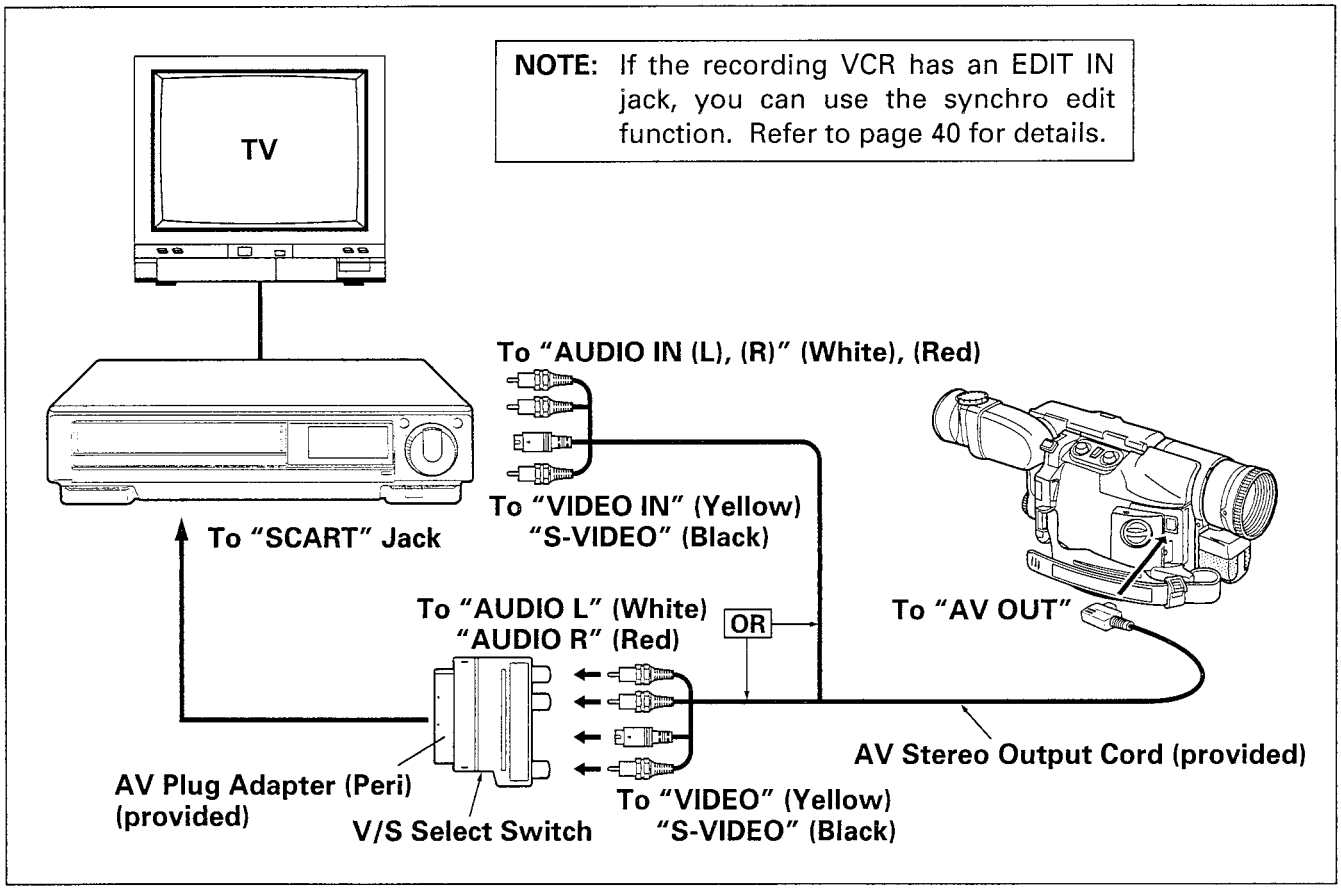


QUICK EDIT

The quick edit feature allows you to search for the end of previously recorded material, or find a particular spot on your tape, to begin your editing, or recording new material. Quick edit is used while the camera/recorder is in the record/pause (stand-by) mode. By holding down the F.FWD, REW, or PLAY button you can visually search or play your tape. Releasing the buttons (F.FWD, REW, or PLAY) immediately stops the tape at that position.



CAMERA/RECORDER TO VCR DUBBING

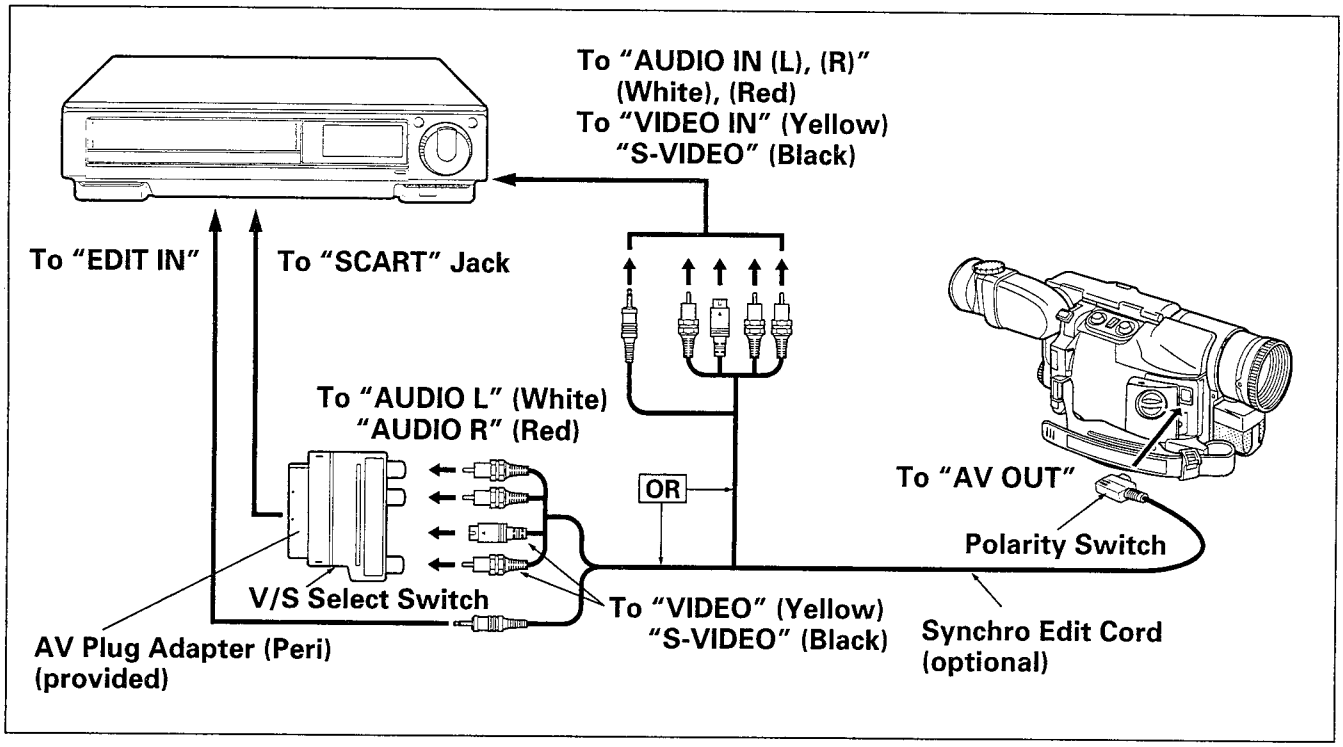

NOTE: If the recording VCR has an EDIT IN jack, you can use the synchro edit function. Refer to page 40 for details.
TV
To "AUDIO IN (L), (R)" (White), (Red)
To "VIDEO IN" (Yellow)
"S-VIDEO" (Black)
To "SCART" Jack
To "AUDIO L" (White)
"AUDIO R" (Red)
OR
To "AV OUT"
AV Stereo Output Cord (provided)
AV Plug Adapter (Peri)
(provided)
V/S Select Switch
To "VIDEO" (Yellow)
"S-VIDEO" (Black)

1. Connect the camera/recorder, VCR and TV as shown in the figure, and then turn on their operate switches. See page 35 for opening the jack cover of the camera/recorder.

   NOTES:
   - Select line input with your VCR. Refer to the instruction manual of your VCR for details.
   - If your VCR has a single (mono) audio input, connect either the left or right audio plug to the audio input on the VCR.
   - If your TV has an S-VIDEO input, connect the S-VIDEO plug (black) instead of the VIDEO plug (yellow).
   - If you use the AV plug adapter to connect the camera/recorder to a VCR which is able to handle S-VIDEO signals, set the V/S select switch on the side of the adapter to "S". Set the switch to "V" for conventional VCRs.
2. Insert the cassette used for editing into the camera/recorder and the cassette to be recorded into the VCR.
3. Play the tape on camera/recorder and record it on the VCR.

SYNCHRO EDIT

Synchro edit allows your camera/recorder to control a compatible VCR (one that has an EDIT IN jack) while tapes are being copied from the camera/recorder to the VCR. This is convenient when you want to record only selected segments from a previously recorded tape.



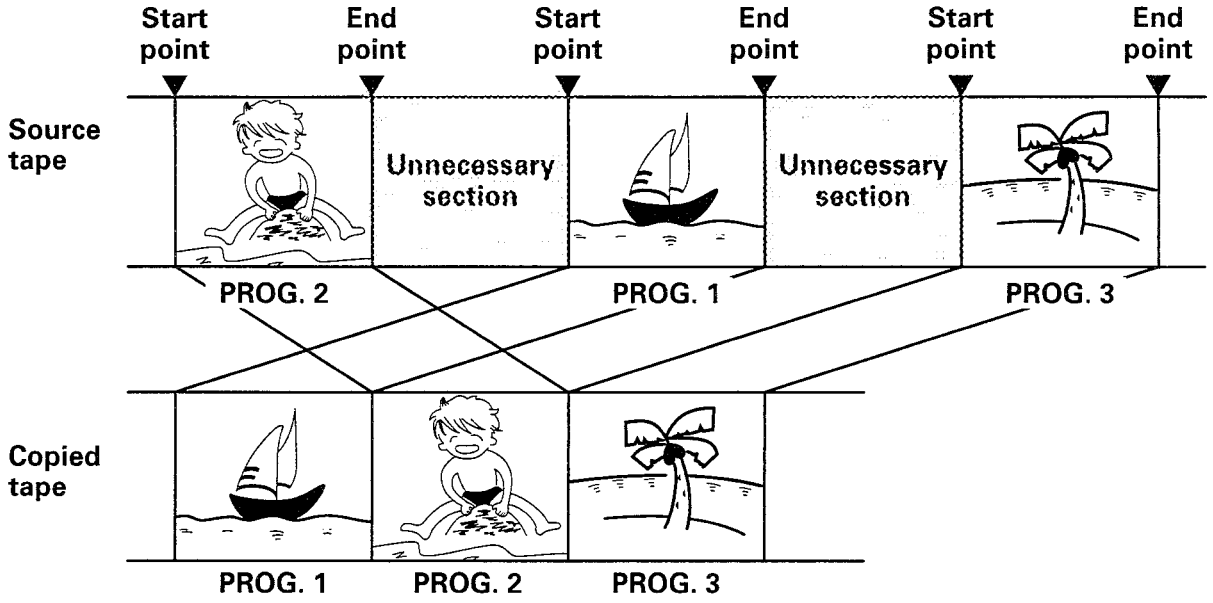
1. Connect your camera/recorder to a compatible VCR as shown above. An optional synchro edit cord is required.
   See page 35 for opening the jack cover of the camera/recorder.
   NOTES:
   - Select line input with your VCR. Refer to the instruction manual of your VCR for details.
   - If your VCR has a single (mono) audio input, connect either the left or right audio plug to the audio input on the VCR.
   - If you use the AV plug adapter to connect the camera/recorder to a VCR which is able to handle S-VIDEO signals, set the V/S select switch on the side of the adapter to "S". Set the switch to "V" for conventional VCRs.
2. Insert the recorded tape into the camera/recorder.
3. Insert the blank tape into the recording VCR.
4. Point the remote control at the receiver on the camera/recorder and use the remote control to operate the camera/recorder.
5. Press PLAY and then REW or F.FWD button to search to the approximate position of the tape on which you want to dub a picture.
6. Press PLAY button again to search the exact position where you stop dubbing and then press PAUSE button.
7. Press DISPLAY button so that the linear time counter with memory appears and then press COUNTER RESET button to set the counter reading to "0:00:00M".
8. Press REW button to rewind the tape to the approximate position from which you want to start dubbing.
9. Press PLAY button, and when the exact position from which you start to dub is reached, press PAUSE button.
10. Press RECORD button on the VCR. The VCR automatically enters record/pause mode.
    NOTE: If the VCR begins to record instead of pausing, you will need to change the position of the polarity switch on the synchro edit cord. Stop the VCR, change the switch, and then press RECORD button on the VCR again.
11. Pressing S.EDIT button puts the camera/recorder in the review mode for several seconds and then into the playback mode.
    The recording VCR starts recording and stops automatically when the counter reading of the camera/recorder reads "0:00:00M".

NOTES:

- Pressing REW, F.FWD, STOP or PAUSE button automatically puts the VCR into the record/pause mode. This allows you to search (forward or backward), fast-forward or rewind the tape in the camera/recorder without disturbing the tape in the VCR.
- To search forward (or backward), press F.FWD (or REW) button. When you press PLAY button, the camera/recorder will resume normal playback. To begin copying again, press PAUSE button and then the S.EDIT button.
- To fast-forward (or rewind) the tape, press STOP then F.FWD (or REW). To begin copying again, press STOP, then PLAY, then PAUSE to pause the camera/recorder, and S.EDIT to begin copying.
- If the tape counter reads "0:00:00M" you cannot start recording.

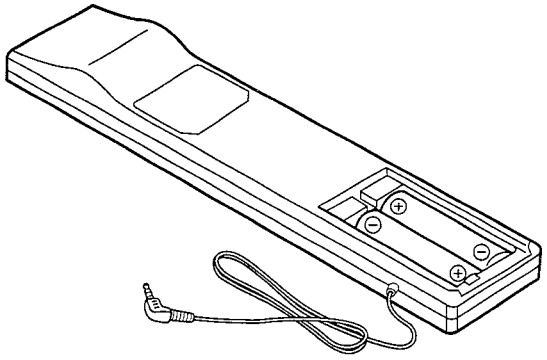
SIMPLE PROGRAMMABLE EDIT

Simple programmable edit allows you to programme your camera/recorder to select the scenes you want to copy from a pre-recorded tape. Use the edit remote control (optional with the VM-H70E or provided with the VM-H71E) to easily copy scenes from a recorded tape in the camera/recorder (playback machine) onto a blank tape in a table-top VCR which handles infrared remote signals (recording machine).



■ How to install the batteries

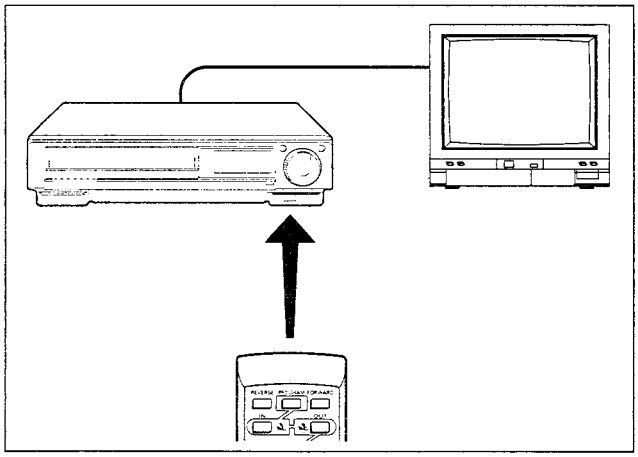
- Be sure to install two IEC R6 batteries before use.
- Be careful to install with the correct polarity.



Cautions on batteries

- Do not use the old and new batteries at the same time.
- Do not mix batteries of different types.
- Do not short, take apart or dispose of batteries by throwing them into a fire.
- When liquid leaks, wipe it off completely and then insert new batteries.

■ Remote controllable range

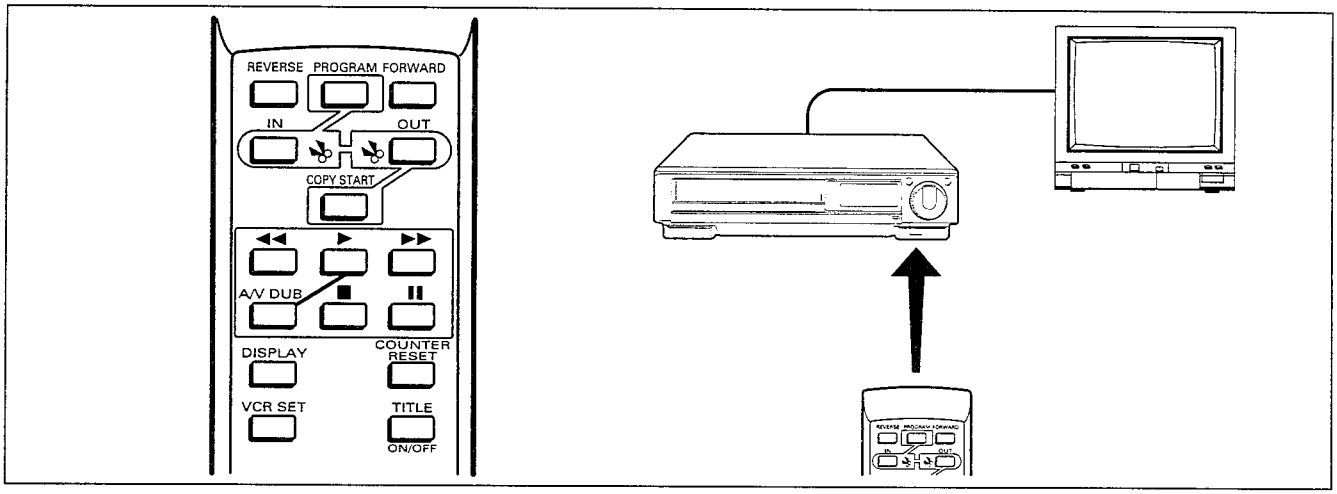


Cautions on the remote control

- Point the remote control straight at the VCR's infrared receiver for operation.
- Use the remote control indoors. When the infrared receiver is exposed to direct sunlight or strong light such as that from artificial lighting, the remote control may not operate correctly.
- The remote control cannot be operated if there is an obstacle between the remote control and infrared receiver. Especially, be careful of this during dubbing.

■ Programming the remote control for the VCR

It is necessary to programme the edit remote control code to match the VCR before starting editing.



1. Turn the VCR on.
2. Aim the remote control at the infrared receiver on the VCR and press the VCR SET button on the remote control and hold it, then press the button corresponding to the VCR's maker code. For example, if you have a PHILIPS VCR, press the VCR SET button and hold it, then press the ❚❚ button. To check whether the remote control code matches that of your VCR or not, point the remote contol at the infrared receiver on the VCR and press the VCR SET button and hold it. If the remote control code has been set, the VCR channel is counted up automatically.

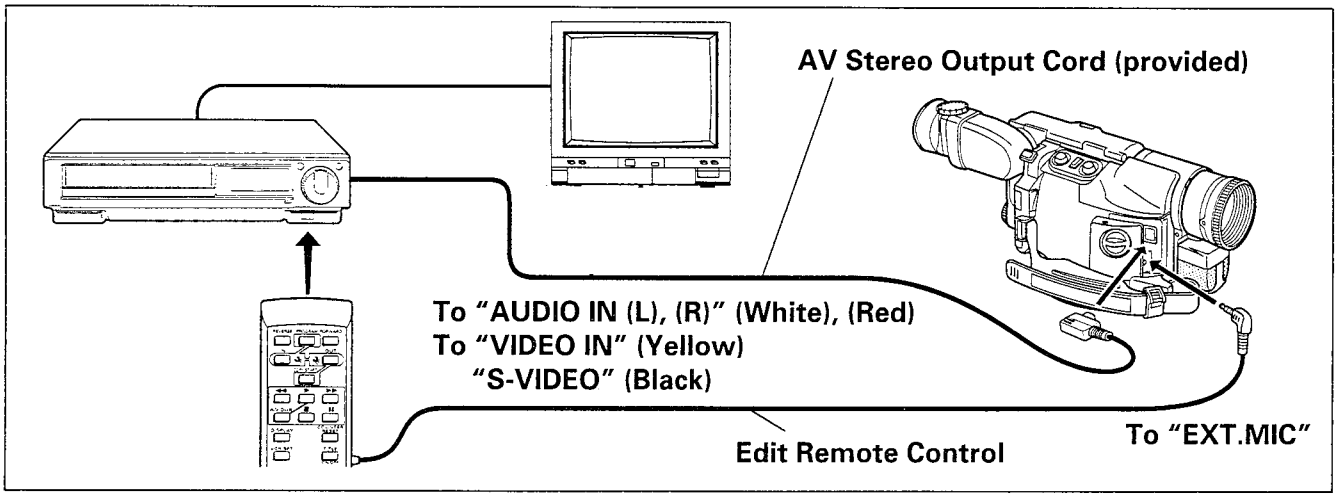
VCR maker	Press VCR SET and the following button
HITACHI	REVERSE
SONY	PROGRAM
Panasonic	FORWARD
TOSHIBA	IN
MITSUBISHI	COPY START
SANYO	OUT
SHARP	◀◀
NEC	▶
JVC	▶▶
AKAI	A/V DUB
Gold Star	■
PHILIPS	❚❚
LOEWE	DISPLAY
Grundig	COUNTER RESET
THOMSON	TITLE ON/OFF

NOTES:

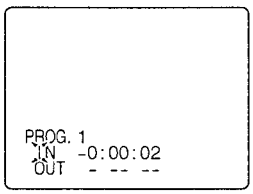
- Your VCR should have an infrared remote control.
- The channel on the VCR may not change even if the VCR maker is the same. Try all combinations of the buttons.
  If the channel still does not change, the edit remote control cannot operate your VCR.
- The remote control code is held in memory until it is changed or the batteries are replaced.

■ Operation

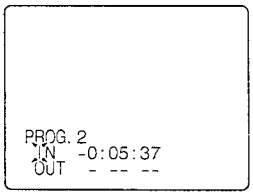
You can select up to four different scenes or segments to be copied at one time.



1. Use the AV stereo output cord to connect the camera/recorder and VCR as illustrated and then connect the edit remote control to the camera/recorder.
2. Insert a recorded tape into the camera/recorder.
3. Set the OPERATE switch of the camera/recorder to "VIDEO".
   Turn the recording VCR on and select line input.
4. Press the PROGRAM button of the remote control. The programme display appears in the viewfinder.



   NOTE: If your VCR is connected to a TV, the programme display will also appear on the TV screen.
5. Press the ▶ button and use the ▶▶ or ◀◀ button to search for the starting point of the segment you want to copy. Press ▶ and then ❚❚ to set the camera/recorder to the play pause mode.
   Use the FORWARD and REVERSE buttons in the play or pause mode to fine adjust the tape position. Press FORWARD and hold it; the tape is played while the button is held. Press REVERSE and hold it for reverse play.
6. Press the IN button to store the counter reading. When you press the IN button, "OUT" flashes in the programme display.
7. Press the ▶▶ button to search for the end of the segment you want to copy. Press ▶ and then ❚❚ to set the camera/ recorder to the play pause mode. Use the FORWARD or REVERSE button as required to fine adjust the tape position.
8. Press the OUT button to store the counter reading at the end of the scene.



9. Continue programming as described above until you have entered up to four different segments.
10. Load a blank tape, then set the VCR to the record pause mode.
11. Point the remote control at the receiver on the VCR and press the COPY START button to start simple programmable edit.
    - The camera/recorder automatically searches for the beginning of the first segment and starts playback. The recording VCR automatically starts recording.
    - After recording the first segment, the camera/recorder automatically searches for the beginning of the next segment and resumes playback. The recording VCR is automatically released from the record pause mode and resumes recording.
    - It continues recording and pausing until all the programmed segments are edited.
12. When simple programmable edit is finished, the camera/recorder will enter the stop mode, and the VCR will enter the record pause mode.
    NOTE: After the simple programmable edit is finished, the programmed data is erased. If you want to continue editing other segments, repeat steps 5—12.

NOTES:

- If you make a mistake in the middle of programming or want to correct the programmed data, start again from the beginning.
- Most VCRs (recording machine) may be released from the record pause mode if it continues for more than five minutes.

■ To end programmable simple edit

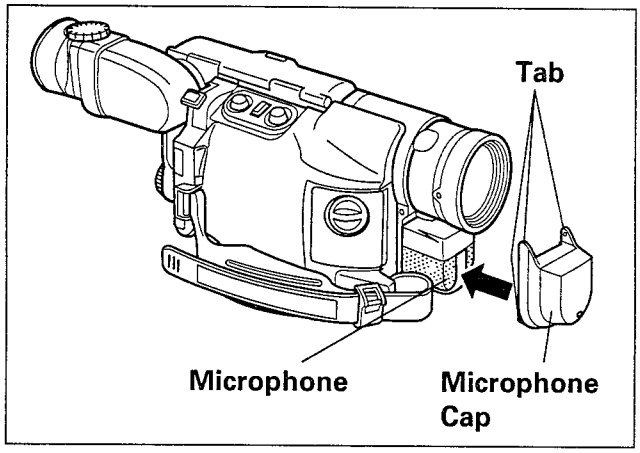
Press the PROGRAM button to remove the programme display from the viewfinder. Then press the stop button on the recording VCR to set it to the stop mode.

NOTE: If the OPERATE switch of the camera/recorder is set to "OFF" or "CAM" when the recording VCR is in the record pause mode, the VCR enters the record mode.

MAINTENANCE AND STORAGE AFTER USE

■ How to maintain

1. Position the microphone cap as shown in the figure and put it on the microphone securely until a click is heard.



2. Close the buckle securely and wipe the case with a cloth moistened with water or wash it with tap water which is flowing gently, to remove foreign matter or salt. (Do not wash the case with water at high pressure. It could cause water to enter.) Use the brush (provided) to wipe off the sand and mud from the clearances of the case, switches, buttons, buckle, etc.
   NOTE: Remove the dirt and dust completely from the terminal section at the bottom using the brush (provided) or a soft cloth.
3. Wipe off the water on the case with a dry cloth.
4. Release the buckle.
   Refer to "How to open and close the case" on page 9.
5. Check that there is no water droplets on the buckle, open the case and dry the camera/recorder in a dark and well ventilated place.

NOTES:

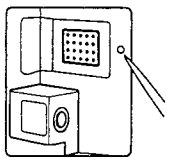
- Do not dry the camera/recorder forcibly using a drier or heater.
- Never use cleaning chemical such as alcohol, thinner, benzine, etc.
- Do not rub the lens with force. The lens could be scratched.
- Do not lubricate the metal sections.

■ Storage

- Store the camera/recorder in a well ventilated place, not in a place at high temperature and high humidity or in a dusty place.

- Store the camera/recorder without closing the buckle and with the case slightly open.

TROUBLESHOOTING

Symptom	Check Point & Correction
Cassette holder cannot be opened when you press the EJECT button.	Connect the power source.
Cassette cannot be inserted into cassette compartment.	Load cassette in direction indicated by arrow on cassette.
	The cassette window must be towards the outside.
Picture does not appear in the viewfinder.	Remove the lens cap.
	Slide OPERATE switch to "CAM".
The camera/recorder cannot go into the recording mode, even when Start/Stop button is pressed.	Check the record-protect tab on the cassette. See page 22 for details.
	Set OPERATE switch to "CAM" position.
	Push the cassette holder embossed PUSH to close it.
	The " ▬ " indication in the viewfinder flashes to indicate battery is discharged. Try another battery or charge the battery.
PLAY button cannot be engaged.	Set OPERATE switch to "VIDEO" position.
Interference on playback picture. (The TV is connected to the camera/recorder using the RF output adapter.)	When you see the playback picture on your TV, adjust fine tuning knob on television set to obtain the best picture.
Picture is out of focus. Auto-focus does not operate correctly.	Press the FOCUS select button to erase "FOCUS" from the viewfinder.
	Auto-Focus does not operate correctly if a special-effects filter is attached or with the objects shown on page 25.
Power is interrupted.	If the record pause mode continues for more than 5 minutes, power is shut off automatically. Press the Start/Stop button to restore the power.
Power is not turned on and no button operations are accepted.	Remove the power source, and after about one minute, push the reset switch (behind the jack cover) gently using a toothpick, etc. until you feel a click. The display will be reset. Then set the information again.  **(beside the AV out jack)**
"TAPE" appears in the viewfinder.	Have you moved the camera/recorder or cassette from a cold place to a warm place so that its temperature changed abruptly? If the temperature has changed, remove the cassette and set the OPERATE switch to "OFF", then wait for about one hour.
	Remove the cassette and then try to reinsert: remove it several times. If the indication is still shown in the viewfinder, use a cleaning tape to clean the heads and replace the cassette.
Playback volume is low or no sound recorded.	Recording was done with the microphone cap attached.
Sound is heard only from one channel or no sound was recorded.	If water splashes directly on the microphone, no sound may be recorded. Dry the microphone thoroughly and make a trial recording before using the camera/recorder.

MAINTENANCE

1. To maintain the optimum performance of this camera/recorder, regular periodic maintenance is required. Your dealer will advise you further.
2. Maintenance and adjustments may not be carried out by the user. In all cases of difficulty or doubt, consult your dealer.
3. Head cleaning
   Dirt accumulated on the video heads after a period of time may cause the playback picture to become blurred or part of the video information to be lost. This does not mean that the recorded programme has been erased but head cleaning is required.
   Use the Maxell 8M-CLT or similar dry type head cleaning tape to clean the video heads.
   When it is difficult to remove a dirt using the head cleaning tape, head cleaning requiring highly technical care is necessary.
   Consult your nearest dealer or VCR service center for head cleaning.

SPECIFICATIONS

■ General

Power requirements	7.2V DC
Power consumption	VM-H70E: 5.5 watts (when recording) VM-H71E: 5.8 watts (when recording)
Operating temperature	0°C to 40°C
Operating humidity	< 80%
Storage temperature	– 20°C to 50°C
Dimensions	VM-H70E: 88(W) x 109(H) x 244(D) mm VM-H71E: 88(W) x 109(H) x 228(D) mm
Weight	VM-H70E: Approx. 900 g (without battery pack, lens hood, lens cap and cassette) VM-H71E: Approx. 890 g (without battery pack, lens hood, lens cap and cassette)

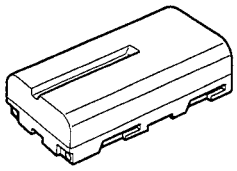
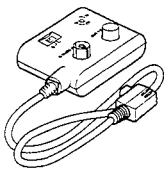
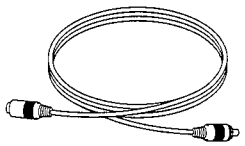
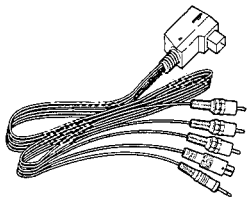
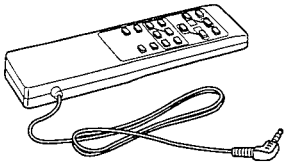
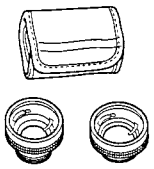
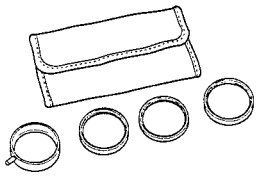
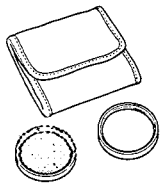
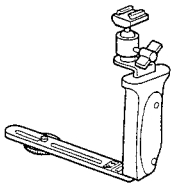
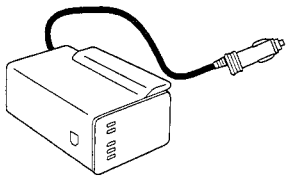
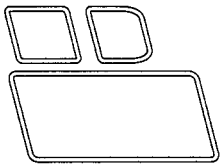
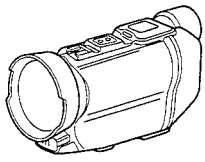
■ Video Recorder Section

Format	8mm
Record/playback system	Four video record/playback heads
Video signal	PAL colour & CCIR monochrome signals 625 lines
Tape speed	SP: 20.05 mm/sec.
Video output	1.0 Vp-p, 75 ohm
Audio output	– 8 dBs, less than 1 kohm
Mic input	0.3mV (–68dBs), high impedance
Fast forward/rewind time	Less than 10 minutes with P5-90 cassette

■ Camera Section

Scanning	625 lines/50 fields/25 frames
Required minimum illumination	3 lux
Camera device	1/3" C.C.D
Lens diameter	46 mm

OPTIONAL ACCESSORIES

Battery Pack VM-NP500H	RF Output Adapter VM-RF85E		Synchro Edit Cord with S-VIDEO Plug VM-CH97
	 		
Edit Remote Control **VM-RM70ED E**	**Conversion Lens Set** **VM-CL12TW**	**Filter Kit** **VM-FL60K**	**Filter Kit** **VM-FL46K**
			
Free Arm ** **VM-FA70**	**Car Adapter/Charger** **VM-CA500E**	**Water-Resistant Packing *** 	**Sports and Marine Pack** **VM-SP500**
	 (to be sold from May, 1994)		 (to be sold from summer, 1994)

* Consult your nearest dealer to replace the packing.

** Used to attach an external microphone.

Additional Information on Edit Remote Control

When the VCR channel is not counted up even if the edit remote control code matches the VCR by following the steps given on page 42 of instruction manual, you may need to change the remote control code of your VCR. For example, if your VCR is made by Hitachi, set the remote control code of your VCR to "VCR 1". See your VCR's instruction manual for details.

If the channel still does not change, it indicates that the edit remote control cannot be used to operate your VCR.